“PREVALENCE OF URINARY TRACT INFECTION IN MALNOURISHED CHILDREN AGED 6 MON TO 5 YRS ATTENDING TERTIARY CARE CENTRE”.

Dissertation submitted for

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BRANCH VII PAEDIATRIC MEDICINE

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CHENNAI

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INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN
MADRAS MEDICAL COLLEGE
CHENNAI

CERTIFICATE

This is to certify that the dissertation titled **PREVALENCE OF URINARY TRACT INFECTION IN MALNOURISHED CHILDREN AGED 6 MON TO 5 YRS ATTENDING TERTIARY CARE CENTRE** submitted by DR.A.SENTHILKUMAR to the faculty of pediatrics. The Tamilnadu DR.M.G.R Medical University, Chennai in partial fulfillment of the requirement of for the award of M.D DEGREE (PAEDIATRICS) is a bonafide research work carried out by him under direct supervision and guidance.

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DECLARATION

I Dr.A.SENTHILKUMAR, solemnly declare that the dissertation titled "**PREVALENCE OF URINARY TRACT INFECTION IN MALNOURISHED CHILDREN AGED 6 MON TO 5 YRS ATTENDING TERTIARY CARE CENTRE"** has been prepared by me.

This is submitted to the Tamilnadu DR.M.G.R Medical University, in partial fulfillment of the rules and regulations for the M.D Degree examination in pediatrics.

Place:

Date:

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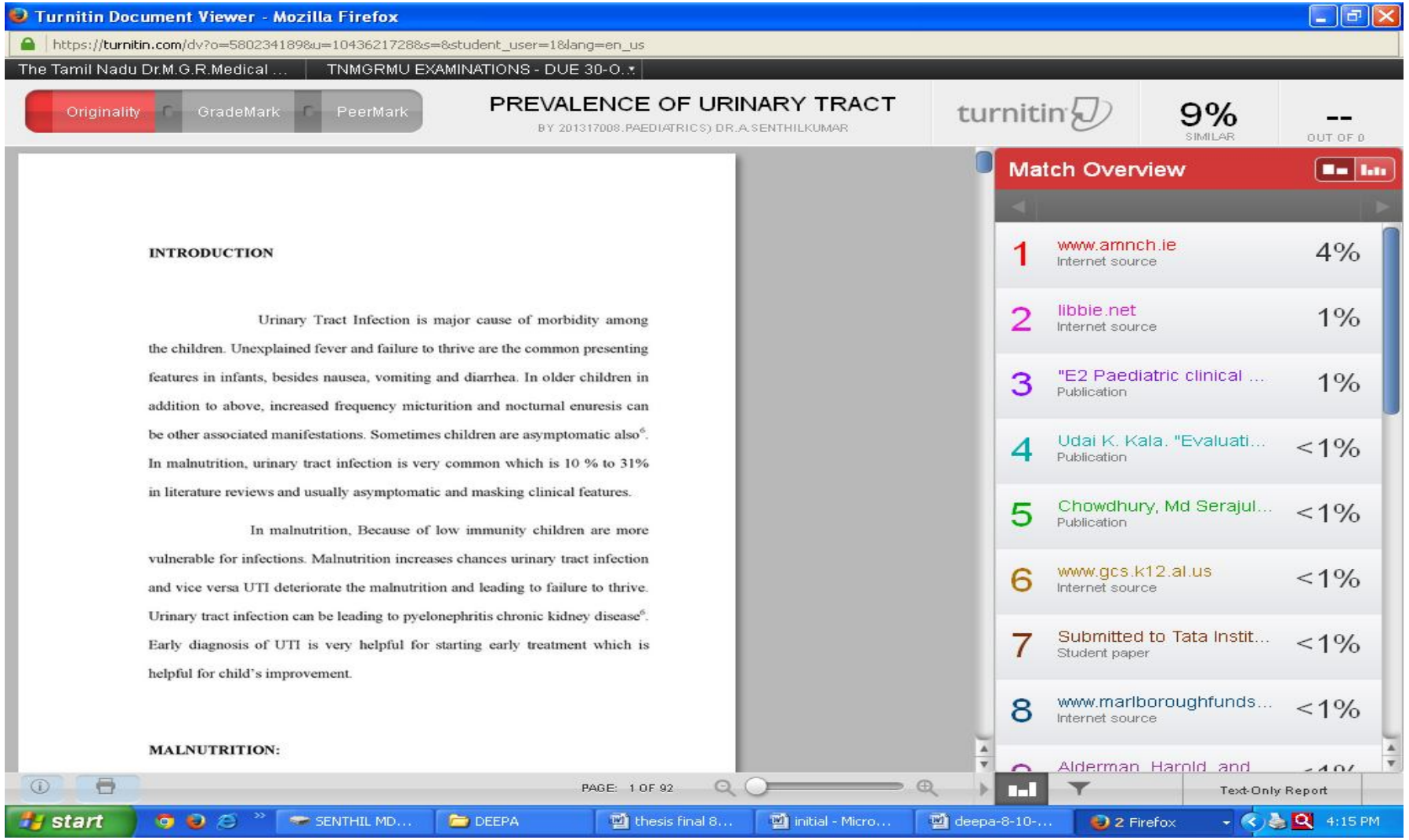
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INTRODUCTION
Urinary Tract Infection is major cause of morbidity among the children. Unexplained fever and failure to thrive are the common presenting features in infants, besides nausea, vomiting and diarrhea. In older children in addition to above, increased frequency micturition and nocturnal enuresis can be other associated manifestations. Sometimes children are asymptomatic also[6]. In malnutrition, urinary tract infection is very common which is 10 % to 31% in literature reviews and usually asymptomatic and masking clinical features.
In malnutrition, Because of low immunity children are more vulnerable for infections. Malnutrition increases chances urinary tract infection and vice versa UTI deteriorate the malnutrition and leading to failure to thrive. Urinary tract infection can be leading to pyelonephritis chronic kidney disease[6]. Early diagnosis of UTI is very helpful for starting early treatment which is helpful for child's improvement.
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INTRODUCTION

NAUTRITION

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CERTIFICATE OF APPROVAL

To
Dr.Senthilkumar.A.
Post Graduate in Paediatrics
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Dear Dr. Senthilkumar.A.

The Institutional Ethics Committee has considered your request and approved your study titled **" PREVALENCE OF URINARY TRACT INFECTION IN MALNOURISHED CHILDREN AGED 6 MONTHS TO 5 YEARS ATTENDING TERTIARY CARE CENTRE"** NO.16032015.

The following members of Ethics Committee were present in the meeting hold on 03.03.2015 conducted at Madras Medical College, Chennai 3

1. Prof.C.Rajendran, MD	:Chairperson
2. Prof.R.Vimala,MD.,Dean,MMC,Ch-3	: Deputy Chairperson
3. Prof.B.Kalaiselvi,MD.,Vice Principal,MMC,Ch-3	: Member Secretary
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8. Thiru S.Rameshkumar, B.Com., MBA.	: Lay Person
9. Thiru S.Govindasamy, BA., BL.,	: Lawyer
10.Tmt.Arnold Saulina, MA., MSW.,	: Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

7/3/15

Member Secretary - Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
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PREVALENCE OF URINARY TRACT INFECTION IN MALNOURISHED CHILDREN AGED 6 MON TO 5 YRS ATTENDING TERTIARY CARE CENTRE;

A.SENTHILKUMAR

Background:

Infections are more common in malnourished children, as result of impaired immunity. Unexplained fever and Failure to thrive are the common presenting features of UTI in children. In malnourished children, UTI is mostly asymptomatic and is leading to pyelonephritis and renal scarring.

Aim:

To evaluate and find out the prevalence of urinary tract infection in malnourished children between 6 months to 5 year and to find out the causing organism and antibiotic sensitivity pattern.

Methods:

A total of 180 cases of malnourished children were enrolled and clean catch midstream urine sample was collected for urine culture according to WHO criteria of malnutrition. In addition to that complete

Blood count, C - reactive protein, blood culture were done. Renal USG was done in all urine culture positive cases. Urinary tract abnormality children were excluded.

Results: Total of 174 cases were present after exclusion. Of 174 malnourished children, 50% were females. Of 174 children, 27(15.5%) children were having UTI. In this study, 37% of children are asymptomatic. E.coli is the is the commonest organism causing UTI 16(59%). Other organism klebsilla pneumonia 4 (14.9%), proteus

mirabilis 3(11.1%), pseudomonas 3(11.1%) . The anti microbial sensitivity patterns are Amikacin(100%),ciprofloxacin (81.4%), cefotaxime (7%). Other common drugs like ampicillin, gentamycin, norfloxacin, cotrimoxazole have developed resistance to these organisms.

Conclusion:

UTI is more common in malnourished children . The clinical presentation will be mostly asymptomatic. Common drugs have become resistance to these organism. Antibiotics have to be started empirically after sending sample for urine culture.

Key words(malnutrition,UTI, Antibiotic spectrum)

INTRODUCTION

Urinary Tract Infection is major cause of morbidity among the children. Unexplained fever and failure to thrive are the common presenting features in infants, besides nausea, vomiting and diarrhea. In older children in addition to above, increased frequency micturition and nocturnal enuresis can be other associated manifestations. Sometimes children are asymptomatic also[6,10]. In malnutrition, urinary tract infection is very common which is 10 % to 31% in varying literature reviews and is usually asymptomatic and masking the clinical features.

In malnutrition, Because of low immunity, children are more vulnerable to infections. Malnutrition increases the chances urinary tract infection and vice versa, UTI deteriorate the malnutrition and leading to failure to thrive. Urinary tract infection can be leading to pyelonephritis and chronic kidney disease[6]. Early diagnosis of UTI is very helpful for starting early treatment which is helpful for the child's improvement.

Malnutrition

Most of the Indian children are living below poverty line. In India 65 percent, nearly 80 million children age of under five years suffering from varying degree of malnutrition.

Socioeconomic factors causing under nutrition are the neglect of girl child, large family size, lack of child spacing and family welfare method like unplanned maternity.

Environmental factors causing under nutrition are parental education, socioeconomic status, sanitation, standard of living, parental attitude and child rearing practice.

Nutritional factors causing malnutrition are breast feeding practices, weaning practices and diet during illness which is all influencing the growth and development. Maternal malnutrition, low birth weight and recurrent infections are the important factors leading to malnutrition. Malnutrition is often starting in womb and ending in tomb. Severe forms of malnutrition like marasmus and kwashiorkor are present in only the tip of iceberg [2,21] .

Prevalence of Malnutrition

In low and middle income countries in 2010, 15% births were low birth weight. In southern Asia, LBW are highest about 26%. In India, low birth weight child is having highest number which accounts approximately 40% of the world LBW. In worldwide in 2011, 16% of the children of less than 5 years were under weight. The weight for age about < -2 SD is considered as underweight children. The global prevalence of stunting is about 20% percent which was reduced from 40%. Stunting prevalence is now highest in African region which is about 36%. Prevalence of vitamin A deficiency is about 33%, iodine deficiency 29% and zinc deficiency 17% [22].

Assessment of Nutritional Status

Nutrition is assessed in school going and preschool going children by anthropometry. International reference was established for normalization of anthropometry measurement in terms of Z score.

Z score defined as the child's height minus median height for that age and sex of the child which are divided relevant standard deviation (SD). By using this growth references comparison of the nutrition level across the country is meaningful.

Height for age is very useful parameter to assess the nutritional status, because it measures skeletal growth. It denotes events which are affecting the nutritional status. They are leading to stunting in the children. This is referred as chronic malnutrition. Weight for height is important for measuring the acute malnutrition which is referred as wasting. Weight for age is additional use for measuring nutritional status[20].

Classification of Malnutrition

Gomez Classification[1]

Nutritional status	Weight for age(Harvard)
Normal	90-110%
Grade1(mild malnutrition)	75-89%
Grade2(moderate malnutrition)	60-74%
Grade 3(Severe malnutrition)	<60%

IAP classification

Nutritional Status	Weight for age(Harvard)
normal	>80
Grade 1	71-80
Grade2	61-70
Grade 3	51-60
Grade 4	<50

Welcome Classification[1]

Weight for age (Boston)	Oedema present	Oedema absent
60% -80% of the standard	Kwashiorkar	Undernutrition
<60% of standard	Marasimic kwashiorkar	marsamus

WHO Classification [1]

a. Acute and chronic malnutrition

Weight for age	Height for age	Weight for height	Interpretation
normal	normal	normal	normal
decreased	normal	decreased	Acute malnutrition
decreased	decreased	normal	Chronic malnutrition
decreased	decreased	decreased	Acute on chronic malnutrition

b. moderate and severe acute malnutrition

NUTRITIONAL STATUS	MODERATE ACUTE MALNUTRITION	SEVERE ACUTE MALNUTRITION
Symmetrical oedema	absent	present
Weight for height	-2SD to -3SD	<-3SD
Height for age	-2SD to-3SD	<-3SD

Weight for height measures Acute Malnutrition (wasting) and Height for age measures chronic malnutrition (stunting)[2]

Standard Deviation Calculation [2]

Z-score (or SD-score) = (observed value - median value of the reference population) / standard deviation value of reference population

Malnutrition And Infections

Malnourished children are lack of immunological defenses. These children are almost comparable with AIDS children.

Nonspecific immunity: mucosal barrier, chemotaxis, bacterial killing lysozymes, compliments, lysozymes, interferon are deficient.

Humoral immunity: Antibodies productions are defective. Ig A is very low. Respiratory and gastrointestinal infections are very common.

Cell mediated immunity: malnourished children are having very low cell mediated immunity. Presence of thymic atrophy, lymphopenia and reduced T helper cells are leading to infections [11].

Urinary Tract Infection in Children

UTI is the one of the common bacterial infection after the acute respiratory tract infection in infants and children. It has variable and nonspecific symptoms. In newborn babies, urinary tract infections are usually presenting as septicemia and jaundice and in infants, it is diagnosed as either acute or chronic Infections. Usually various urinary tract anomalies, abnormalities and voiding dysfunctions are leading to chronic infections. Children presenting with acute pyelonephritis are prone to developing renal scarring and chronic renal failure. These are leading to hypertension, proteinuria, pregnancy related complications (eclampsia) and end stage renal failure [6,14,15,20].

Diagnosis of UTI is often delayed or missed because of minimal and vague symptoms. This leads to delay in starting treatment and causing extensive morbidity. Early identification and adequate management is necessary in preventing renal scarring and chronic renal failure. Because of improper management and inappropriate antibiotic therapy is leading to recurrence of UTI and persistence of voiding dysfunctions and vesico ureteric reflex. These risk factors are causing renal scarring in growing children[3,6,7].

Prevalence of UTI in children

Before 14 years, risk of UTI in children is 1% in males and 3% to 5%female children. In infancy male to female ratio is 3% to 5% in boys and 1% in girls. Beyond infancy, the ratio is 1:10. Mainly female preponderance is noted[14].

Definition and classification of Urinary tract infection.[1,22,14,,15,19]

In procedurally collected urine sample, presence of pyuria and bacteria are usually considered as bacteriuria. Growth of single species bacterial organism are identified as urinary tract infections.

- In midstream urine sample - Infection is likely if colony count $>10^4$ in a boy and probability of infection is 95% in girl with three consecutive specimens $> 10^5$
- In catheterized urine sample –if colony count $>10^{5,}$ the probability of infection is 95%. And in between 10^4 and 10^5 , infection is likely.
- In suprapubic aspiration - any growth of colony count, probability of infection is 99%.

Asymptomatic bacteriuria

Significant bacteriuria is present in the absence of symptoms of UTI.These are mostly seen adolescent girls and school going children. The incidence is varying 1 % of girls to 0.05% of boys. Urinary tract infections

without symptoms with normal CRP level specifies as asymptomatic bacteriuria. In few studies have mentioned that there was chances of pyelonephritis, so it is helpful in doing ultra sonogram to rule out major anomalies of urinary tract. Low virulent E.coli is may be the cause which present with colonization of virulent organism. If we are doing aggressive treatment which will lead to replacement of colonization of virulent organism. Pyuria is usually not seen. vesico ureteric reflex is seen in 20 to 35 percent cases. Renal scarring is not seen in many DMSA scan studies. So There is no need of prescribing antibiotics. Neurogenic bladder children are having more numbers of asymptomatic UTI [1,15].

Upper urinary tract infection

Children presenting with fever, flank pain and systemic symptoms are the features of upper UTI. These are the signs of inflammation of the renal parenchyma which referred as acute pyelonephritis. Pyelonephritis is the large serious infection which mentions to rule out any urinary tract abnormalities [14].

Lower Urinary Tract Infection

Children presenting with urgency, dysuria and frequency are considered as lower UTI or cystitis. Cystitis is due to inflammation of bladder mucosa. Dysuria frequency syndrome is another name for calling these symptoms. Lower UTI are common in females. They are having less chance urinary tract anomalies[15].

Complicated urinary tract infection

Children are presenting with fever more than 39^0 c, systemic symptoms, vomiting, dehydration and renal angle tenderness with or without elevated renal functions test are called as complicated UTI.

Simple Urinary tract infection

Children are presenting with symptoms of lower UTI like urgency, dysuria and frequency and with or without fever are called as simple UTI.

Recurrent urinary tract infection

Children presented with second attack of UTI are termed as recurrent UTI. Those children who had previously recovered with appropriate treatment were newly coming with recurrence of symptoms and significant bacteriuria was termed as recurrence UTI.

Relapse of UTI

Recurrence UTI with same organism within two week or reinfection after two week with same organism or different organism is described as relapse of UTI.

Organism causing UTI

E.coli is the common uropathogenic organism causing UTI in about 60 to 80 percent. Other organism causing UTI are proteus, klebsilla, staphylococcus, enterococcus and enterobactor. The uncommon organism causing UTI are pseudomonas, staphylococcus aureus and staphylococcus epidermis.

Pathogenesis

UTI is caused by ascending from lower urethra. The invading organism from fecal flora is colonizing in periurethral and perineal region. These organism are entering through intraurethrally and are causing UTI, cystitis and pyelonephritis. The occurrence UTI in children is depends on the bacterial virulence and host factors. Other factors causing UTI are increased uroepithetlial adherence, VUR, intrarenal reflex, presence of foreign body like catheter, stones in the renal and ureter, structural abnormality, the stickier mucosa and vulnerable uroepithelium and immunosuppression.

Clinical features

Upper UTI: In newborn, children with UTI is presenting septicemia, jaundice, failure to thrive are the common presenting features in the young children. In older children, burning urination, frequent day time passing urination, passing fowl smelling of urine and secondary nocturnal enuresis. Any infant or child with fever more than three days without direct cause or focus is considered to suspect UTI[13,14].

Lower UTI: Dysuria, urgency, frequency urination, pyuria, with or without fever are the common presenting symptoms. Cystitis is the inflammation of the bladder mucosa.[13,14]

Sampling method[1,23]

Midstream urine collection method

When asked to collect urine in older children can easily pass urine for collecting a mid stream urine. However, children may be needed some help to collect urine sample. Initially, children are needed to wash their hands. Then children are needed to wipe their hands with gauze and sterile water. Girls must wipe themselves from the front to the back and discard the gauze/wipe. Boys are needed gently retraction of foreskin, and entire surface was cleaned with the gauze soaked with the sterile water. First voided urine sample was not collected

and discarded. Initial urine removes the urethral contaminants. Then we have to collect midstream urine which should be sent to laboratory [23].

How to clean your child

- To clean your children's genital area using sterile water and gauze.
- To wash your hands before and after cleaning your child.

For Girls

1. Gently to separate the labia and clean with the gauze soaked with the sterile water thoroughly.
2. To clean from the front to the back and the gauze should be discarded.
3. To gently pat the genital region dry with a clean sterile swab.

For Boys

1. To gently retract the foreskin, and clean the entire surface with the gauze soaked with the sterile water.
2. To replace the foreskin once dry.
3. To pat gently the genitalia dry with a clean sterile swab.

Finger Tap Urine Collection

Finger tap urine collection gives a easy and reliable way of getting a clean urine sample from the baby who are not toilet trained. This should be started one hour after a feeding. This is not to be done before. There is needed a sterile urine container. Clean your child's nappy area .To wash your hands and finger before and after cleaning.

- Child is needed to lying on her back in cot with removed nappy, one hour after feeding.
- Have ready the lid of off urine container. There should not be any contamination inside the container or its lid. Otherwise the urine test may be wrong.
- In the mid line just above the public symphysis to tap with two fingers.
- To give one tap every second for one minute, then stop and wait for one minute, then tap for one more minute and so on until urine comes. Sample should send immediately to the laboratory.

Transurethral Bladder Catheterization

The catheterization of the urethra is a effective method for obtaining urine samples for culture in most infants and children and the procedure is safe also. The procedure can be difficult in collecting samples in uncircumcised boys. They may be needed to have suprapubic aspiration if the urethral meatus cannot be accessible[23].

Suprapubic Bladder Aspiration– Suprapubic bladder aspiration is a effective and safe method for obtaining urine specimens in infants and young children. This distended bladder which is above the level of the pubic symphysis is easy to access percutaneously. The bladder has to be percussed or palpated before the procedure and the child's bladder has not be emptied for 60 minutes before the procedure .Some times, percussion or palpation of the bladder may initiate urination in some children. Then a sterile 2ml syringe with needle straight about 2 cm above the pubic symphysis into the bladder. 2

ml of urine is aspirated. And the sample is transferred to laboratory. This method is effective and is the gold standard procedure in the diagnosis of UTI.

Clean Voided Bag Samples: Practicing of obtaining urine specimens by the clean voided bag which is for medical staff and parents only because it is non invasive. But it should not be used to obtain urine samples for culture. Because the results are more false positive[23].

INVESTIGATIONS

Urine examinations

Rapid test

1. Dipstic method

Urinary nitrate and leukocyte esterase are rapid test. These tests are showing false positive false and negative results. Because nitrate reductase enzyme can be converting urinary nitrate into nitrite. If there is not adequate time for incubation, the test will become negative. Leukocyte esterase test is also useful for detecting leukocyte in the urine. If we are using these test by combined, the specificity of the test will be increased[15].

In centrifuged urine, leukocytes more than 5 WBC/HPF while in uncentrifuged urine leukocytes more than 10 WBC/HPF are described as pyuria. Pyuria may be absent in children with UTI also.

2. Microscopy: when gram staining is done, presence of bacteria considered as urinary tract infection [16].

Enhanced urine analysis

Uncentrifuged urine is used for the test. Urine is stained with neubar chamber. If there is presence bacteria, when we are seeing in the oil immersion field with gram stained are considered as urinary tract infection. It has better sensitivity and specificity when we are using combined with other rapid tests[17].

Urine culture and sensitivity

It is the gold standard test to detect UTI. It will take 24 to 48 hours needed for the results. The culture was done on cysteine lactose electrolyte deficient agar (CLED), mackonkey agar and blood agar plate which were incubated at 37^0 C and read after 24 hours. A diagnosis of UTI was made presence of single organism growth $>10^5$ CFU/ml in midstream urine sample and presence of any colony count in supra pubic aspiration[5].

Other investigations

Increased leukocyte count , neutrophilia, increased c-reactive protein, elevated ESR levels are seen UTI. Blood urea, creatinine and serum electrolytes are needed to evaluate renal functions.

Renal ultra sonogram is also needed for detecting any anatomical defects, size of the kidney, position of the kidney, any dilated pelvic calyces, any pyelonephritis and cystitis[14].

Management:

Hospitalization of the child is depends upon the age of the child, features of toxicity, oral intake, laboratory investigation of bacteremia and immunocompromised status. It is better to avoid NSAID. Paracetamol can be given to fever. Definite antibiotic therapy is required to prevent infection and to reduce renal damage and further complication. Children with complicated UTI and infants less than 3 month should be admitted in hospital. They are treated with parenteral antibiotics. Ceftriaxone, cefotaxime , amino glycoside, and amoxyllin clauvunate are used as first line antibiotics. Parenteral antibiotics are given for 48 to 72 hours. Then oral antibiotics has been changed depending upon the clinical improvement. Cefixime, coamoxiclav, ciprofloxacin and cefdinir are the antibiotics used as orally. Following treatment, the symptoms has to subside within 48 to 72 hours, if not there is developing of resistant organism. Acute pyelonephritis infants and children are treated with 10 to 14 days of antimicrobial therapy[14] .

Children with simple UTI are needed 7 to 10 days of antibiotics. Prophylactic antibiotic has been given to children less than 1 year. There will not be necessary in doing repeat urine culture, unless there is presence of fever and systemic symptoms [13,15,18].

Malnutrition and Urinary Tract Infection

In malnourished children, urinary tract infection is very common. Because of following reason UTI are very common.

Nonspecific immunity: mucosal barrier, chemotaxis, bacterial killing lysozymes, compliments, lysozymes, interferon are deficient.

Humoral immunity: antibodies production is defective. Ig A is very low.

Respiratory and gastrointestinal infections are very common [1,3,11].

Cell mediated immunity: malnourished children are having very low cell mediated immunity. Presence of thymic atrophy, lymphopenia and reduced T helper cells are leading to infections.

REVIEW OF LITERATURE

1. H.CAKSEN et al have conducted a study on prevalence of urinary tract infection and antibiotic sensitivity in malnourished children. It was a prospective study. In the study,103 children were included in DEPARTMENTNOF PAEDIATRICS IN YUZUNCU YIL UNIVERSITY HOSPITAL, duration between may 1998 to November 1998. Children who are weight below 90 th percentile corresponding to age were included as malnourished child. Five are or more leukocyte are considered as pyuria. More than 10^5 colonies/ml of single organism considered as urinary tract infection. Routine physical and chemical examination, routine urine analysis and urine culture were done to all 103 children.

In the study, out of the 103 malnourished children, 31 children showed urine culture positive and of the 31 children of UTI, 12 children were boys(38.6%) and age of the children were 50 days to 30 month. Primary symptoms are vomiting and diarrhea (74.1%), fever (32.2%),cough (19%),diarrhea alone (9.6%) and seizure 9.6%. In the study 51.6 percent children was received previous antibiotic therapy before admission.

In this study, 7 children had mild, 11 children moderate and 13 children had severe malnutrition. There was no significant difference in between grades of malnutrition about urinary tract infection (p value>0.005.)

Pyuria was seen in 12 (38%) and anemia was seen in 10(32.2%).Hemoglobin was ranging from 5.3 to13.9 gm. common organism was identified from culture is E.coli and other organism were found klebsilla pneumonia and proteus mirabilis. E.coli organism mostly were resistant to cotrimoxazole and ceftriaxone which were about 83.3% and 17.6%[3].

2. **Arvina Bagga and his collegues** in AIIMS hospital have conducted study to find out the incidence bacteriuria in malnourished children aged 6 month to 5 years. The article was published in paediatric nephrology 18th march 2003.It is a prospective study. For each malnourished child, a normal nourished child was matched. The factors matched are age, sex and presence of fever and diarrhea. Total of 112 children were included in the study. Out of these 65 were boys and 47 were girls. Nutritionally 55 had moderate and 43 were severe malnutrition.43 children had diarrhea and 35 children had fever. Clean catch mid stream urine collection and suprapubic aspirated urine collection were taken from the children under precautious measure. These specimen were sent and examined microscopically and cultured..

Significant bacteriuria was present in 17(15.2%) malnourished children and 2(1.8%) in control normal nourished children ($p<0.01$). In the incidence of bacteriuria in malnourished children normal nourished children with fever was 28.6% and 5.7% respectively ($p<0.005$) risk of bacteriuria significantly increased with severe grading of malnutrition and also with diarrhea .Bacteriuria was associated with symptoms (70.6%) and associated with raised

acute phase reactants(88.2%).Elevation of acute phase reactants indicates presence of UTI[4].

3.**KALA UK and JACOB DW** have conducted a study about evaluation of urinary tract infection in malnourished black children.75 malnourished black children evaluated for urinary tract infection by urine culture obtained supra pubically before antibiotic therapy. All children with urine culture positive cases were investigated by renal ultra sonogram, intravenous pyelogram and micturating cysto urethrogram. The mean age of the children was 15.5 months ranges from 3 to 6 month. Urinary tract infection was found in 26 (34.7%) of whom 21 were boys remaining were girls. Overall UTI with kwashiorkor and marasmus kwashiorkor was 42%. E.coli was the most common organism cultured which was 84.6%.Renal ultra sonogram, intravenous pyelogram and voiding urethrogram were normal in all UTI cases and vesico ureteric reflex was noted in any of the above children. The study is confirming the UTI in malnourished children. NO anatomical abnormality was noted in these children[6].

4. **Starcea M et al** who have conducted study characteristics features of urinary tract infections in undernourished children. It is a Romanian study. The prime aim of the study is to prove the association between UTI and malnourished children 0-3 years. The study was conducted between January 2000 and December 2000. It is retrospective study. They have conducted study of 298 infant and young children who are proved UTI. Of this 237 children are having normal nourishment and 61 children are having under nourishment.

Statistical method was identified the relative risk of urinary tract infection in malnourished children. The predictive value was 72.5%.Urinary tract abnormality was observed in two times in malnourished children.

The organisms of the infection mostly reported are E.coli, Proteus Mirabilis and Klebsilla Pneumonia. In malnourished children, 5% UTI was noted and infected by opportunistic infections like enterococcus, enterobactor and acinobactor. Frequently, the organism causing UTI is developing resistance to common antibiotics like aminopecillin, cotrimoxaxole and cephalosporin[8].

5. **Banapurmath CR and Jeyamonys** have conducted study of prevalence of severe malnutrition in the age group of preschool children. It was a prospective of 88 severely malnourished children, In IAP grading of malnutrition,3 and 4 were studied .53 of the normal nourished children are included as controls. Urine samples were collected by supra pubic aspiration in those who are not attained bladder control where as by midstream urine collection in older children. Samples were sent immediately for laboratory and was examined microscopically and samples were cultured.

UTI was found 7 out of 88 malnourished children which was about 8%.Respiratory infections (31.8%), diarrhoea(27.2%) and TB meningitis(12.7%) were noted besides UTI[7].

6**.Rabasa Al and Sharma** have conducted a study to urinary tract infection in children with severe malnutrition at the MAIDUGUCI teaching medical institution. In the study, 194 children of severe under nutrition were

included and investigated. It is a prospective study. Prevalence of UTI in children with severe malnutrition was noted 11.3%. There was not seen any variation to sex and categories of malnutrition. E.coli was the commonest organism seen in urine culture. In the study, they observed that the resistance was developed to the second and third generation cephalosporin [9].

STUDY JUSTIFICATION

In malnutrition, UTI is very common and hidden. Because of causing immune suppression and the symptoms are usually asymptomatic. UTI can also worsen the malnutrition. And leads to failure to thrive. UTI can lead to pyelonephritis and chronic kidney disease. Early diagnosis of UTI is useful for starting early treatment, which is very helpful for the child improvement [6],[1]. If we found out the prevalence, which organism commonly causing, which drug commonly sensitive will be also helpful to start empirical antibiotic after taking urine culture. In Indian context, only very limited studies are done.

OBJECTIVE OF THE STUDY

To evaluate and find out the prevalence of urinary tract infection, and organism causing UTI and their antibiotic susceptibility pattern in malnourished children in the age group of 6 months to 5 years attending a tertiary care hospital.

METHODOLOGY

1.Study Design:-

Descriptive study

2.Study Setting:-

General Ward And Nutrition Out Patient Department,

Institute Child Health, Egmore, Chennai.

3.Study Period:

March 2015 To September 2015

4. Time Line:-

Data collection:- march 2015 to july 2015.

Data Analysis And

Manuscript Preparation:- August 2015.

Submission Of Report:- September 2015

5. Study Population:-

6 Months to 60 months Malnorished children

6. Inclusion Criteria:-

- . Age 6 month –5 yrs

- Both boys and girls
- Both MAM and SAM according to WHO criteria.
- Both symptomatic & asymptomatic cases

7. Exclusion Criteria:-

1.Any congenital anomalies in G.U.T

2. Obtructive uropathy &renal problems.

3. Pts on steroids.

4. Immunodeficiency disorder

5. HIV infection

8. Sample size:- 180.

9. Sample size calculation:

In this study, according to H.caksen et al, prevalence of UTI in malnourished children is 30%. By using this formulae, sample size calculated as 180. For prevalence study,

$4PQ/D^2$ P-prevalence D-relative precision(20%) Q=1-p

DEFINITION

1. Malnutrition: According to the WHO criteria, Moderate acute malnutrition and severe acute malnutrition were taken to the study [2].

NUTRITIONAL STATUS	MODERATE ACUTE MALNUTRITION	SEVERE ACUTE MALNUTRITION
Symmetrical oedema	absent	present
Weight for height	-2SD to -3SD	<-3SD
Height for age	-2SD to-3SD	<-3SD

Criteria For Severe Acute Malnutrition [2]

1. Weight for height: < -3SD
2. Mid upper arm circumference <11.5 cm
3. Bilateral oedema

2. Significant Bacteriuria:

In midstream clean catch urine sample, any growth present > 10^5 cfu/ml, is considered as bacteriuria.

3.Pyuria:

More than 10 WBC /HPF in uncentrifuged in urine is considered as pyuria.

4. Anemia:

Hemoglobin <10 gm is considered as anemia.

5. Leukocytosis:

> 12000 WBC count in per micro liter is termed as leukocytosis.

6. Raised CRP:

CRP > 20 mg is considered as raised CRP.

Outcome Measured:

1. Microbiological spectrum in urine culture

2. Antibiotic susceptibility pattern

Study Manoure

Children were all enrolled in this study according to the anthropometric measurements, nutritional status and the inclusion criteria. Children are included in the study after obtaining written informant consent. Baseline demographic data format and clinical history were noted.

The Proforma Including the Data:-

- NAME
- AGE
- SEX
- IP NUMBER
- H/O PRESENT ILLNESS
- H/O fever, chills and rigor
- H/O dysuria, burning urination, dribbling of urine, hamaturia
- H/O vomiting , diarrhoea
- H/O nocturnal enuresis

Anthropometry

1.Height 2.Weight 3.Midarm Circumference

Who Classification For Malnutrition(In standard deviation)

1.Weight for age

2. Height for age

3. Weight for height

4. Mid arm circumference(MAC)

5. Edema

Classification of malnutrition

1. Moderate acute malnutrition(MAM).
2. Severe acute malnutrition (SAM).

General Examination

Systemic Examination

Investigation

Urine microscopy

Urine culture sensitivity

Complete blood count

CRP

Blood culture

USG abdomen

In institute of child health, egmore, children were included in study from the general ward and nutrition outpatient department in the age group of 6 month to 5 years. Anthropometric measurement height, weight and mid arm circumference were measured.

Measurement of weight:

It is done by weighing scale.

1. Electronic baby weighing scale

2. Paediatric beam balance weighing scale

In small children are used electronic baby weighing scale. In paediatric beam scale, children more than 2 years they will stand and the weight will be recorded. In children less than 2 years, mother's weight is separately measured and both mother and baby separately measured. Finally mother's weight is subtracted from total. There by baby's weight measured[2].

Measurement of height:

Length: children less than 2 years of age or bedridden were measured by Infantometer[2].

Height: children >2 year are measured by stadiometer[2].

Steps in measuring height:

1. Look straight

2. Both feet and knee together.

3. Head should be in Frankfurt position.

Lower margin of orbit and upper margin of external auditory canal should be straight. This is known as Frankfurt position [2].

Difference between length and height are 2 cm because while standing ligaments are compressed.

Midarm circumference(MAC): It is used for more than 1 year. It is measured with tape. It should be measured between acromian and olecranon process by arm hanging side of the body. Mid arm circumference is 16-17 cm between 1-5 years. In children, if MAC is <11.5 cm will be considered as severe acute malnutrition [2].

The clinical examination was done. General examination and systemic examination were done in detail in all children.

Edema was noted . Edema is a important parameter used for classification for malnutrition. If edema is present, it will be considered severe acute malnutrition [2].

According to WHO criteria children were included in the study to see moderate acute malnutrition (MAM) and severe acute malnutrition (SAM), In these children, on the basis of exclusion criteria, children were removed from the study.

In both MAM & SAM, urine sample were collected irrespective of symptoms whether symptomatic or asymptomatic.

Before collection of urine, all the information and the methods about collection of urine were told to the parents.

In the study, mid stream urine was collected in the age group of children 6 month to 5 years. In children who are not toilet trained, finger tap of collection of midstream method is used where as in toilet trained children midstream collection of method was used for urinary sample collection [21].

Mid stream urine collection method:

When asked to collect urine older children can easily pass urine to collect a mid stream urine. However, children may be needed some help to collecting urine sample. Initially children are needed to wash their hands. Then children are needed to wipe their hands with gauze and sterile water.

Girls must wipe themselves from the front to the back, discard the gauze/wipe. Boys are needed gently retraction of the foreskin, and entire surface was cleaned with the gauze soaked with the sterile water .First voided urine sample was not collected and discarded. Initial urine removes the urethral

contaminants. Then we have to collect midstream urine which should be sent to laboratory [21].

How to clean your child:

- To clean your children's genital area using sterile water and gauze.
- To wash your hands before and after cleaning your child.

For Girls

1. Gently to separate the labia and clean with the gauze soaked with the sterile water thoroughly.
2. To clean from the front to the back and the gauze should be discarded.
3. To gently pat the genital region and dry with a clean sterile swab.

For Boys

1. To gently retract the foreskin, and clean the entire surface with the gauze soaked with the sterile water.
2. To replace the foreskin once dry.
3. To pat gently the genitalia dry with a clean sterile swab.

Finger Tap Urine Collection

Finger tap urine collection gives a easy and reliable way of getting a clean urine sample from the baby who are not toilet trained

- This should be started one hour after a feeding. There is needed a sterile urine container.
- Clean your child's nappy area .To wash your hands and finger before and after cleaning.

- Child is needed to lying on her back in cot with removed nappy.
- Have ready the lid of off urine container. There should not be any contamination inside the container or its lid. Otherwise the urine test may be wrong.
- To tap with two fingers in the mid line just above the public symphysis in the midline, to tap with two fingers.
- To give one tap every second for one minute, then stop and wait for one minute, then tap for one more minute and so on until urine comes. Then 10 minutes has passed. Sample has been sent immediately to the laboratory [21].

Collected urine sample has been sent for to do rapid test and urine culture and sensitivity.

Rapid test:

1 .Dipstick method.

Urinary nitrate and leukocyte esterase are rapid test. These test are showing false positive false and negative results. Because nitrate reductase enzyme can be converting urinary nitrate into nitrite. If there is not adequate time for incubation, the test will become negative. Leukocyte esterase test is also useful for detecting leukocyte in the urine. If we are using these test by combined, the specificity of the will be increased.

In centrifuged urine, leukocytes more than 5 WBC/HPF while in uncentrifuged urine leukocytes more than 10 WBC/HPF are termed described as pyuria. Pyuria may be absent in children with UTI also.

Microscopy: when gram staining is done, presence of bacteria considered as urinary tract infection[15].

Urine culture and sensitivity:

It is the gold standard test to detect UTI. It will take 24 to 48 hours needed for the results. The culture was done on cysteine lactose electrolyte deficient agar(CLED), mackonkey agar and blood agar plate which were incubated at 37 C and read after 24 hours. A diagnosis of UTI was made presence of single organism growth $>10^5$ CFU/ml in midstream urine sample[5] .

STATISTICAL ANALYSIS

Data was entered in excel sheet. Statistical analysis was done using statistical software SPSS. Qualitative variables were expressed as proportion and quantitative variables. Outcomes were expressed in proportions.

ETHICAL CONSIDERATIONS

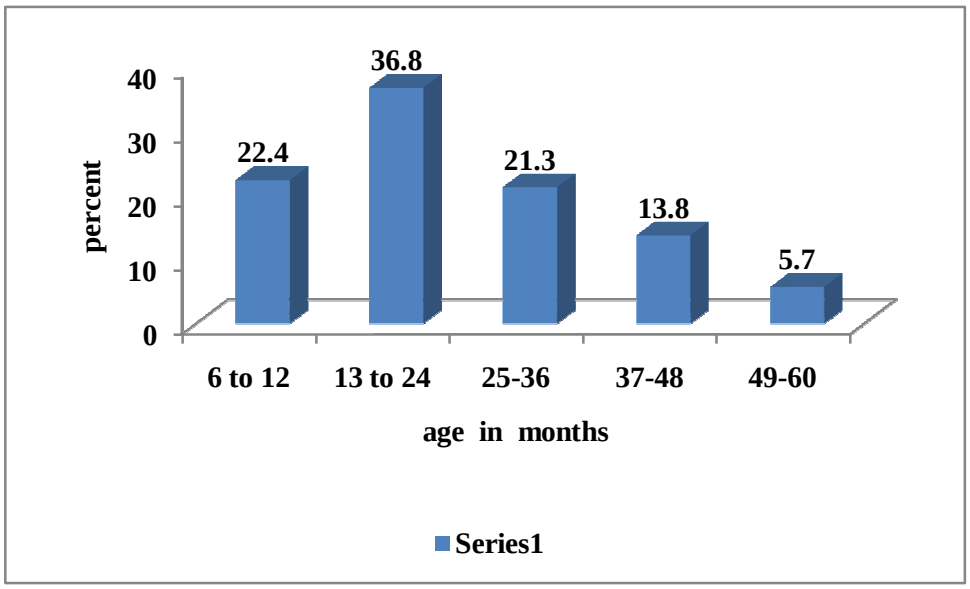
- Ethical clearance from institutional review board was obtained.
- Written informed consent was obtained from parent of each patient.
- Strict confidentiality of data was maintained.

Frequency of Age in the Study Population

Age in months	Frequency	Percent
6-12	39	22.4
13-24	64	36.8
25-36	37	21.3
37-48	24	13.8
49-60	10	5.7
TOTAL	174	100

In this study, more children(64) were in the the age group of 13-24 months.

Age Frequency in Study Population (Bar Diagram)



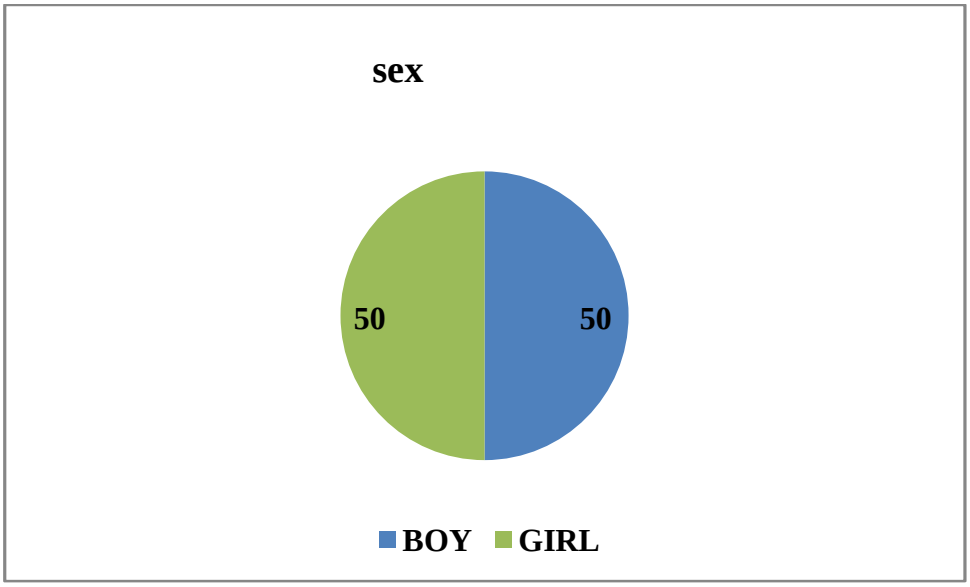
Majority of the children were in 13-24 months of the age which was about 36.8%

Frequency Table Shows Sex Distribution

Sex	Frequency	Percent
MALE	87	50
FEMALE	87	50
TOTAL	174	100

In this study, 50% were males and 50% were females.

Pie Chart Showing Sex Distribution in this study



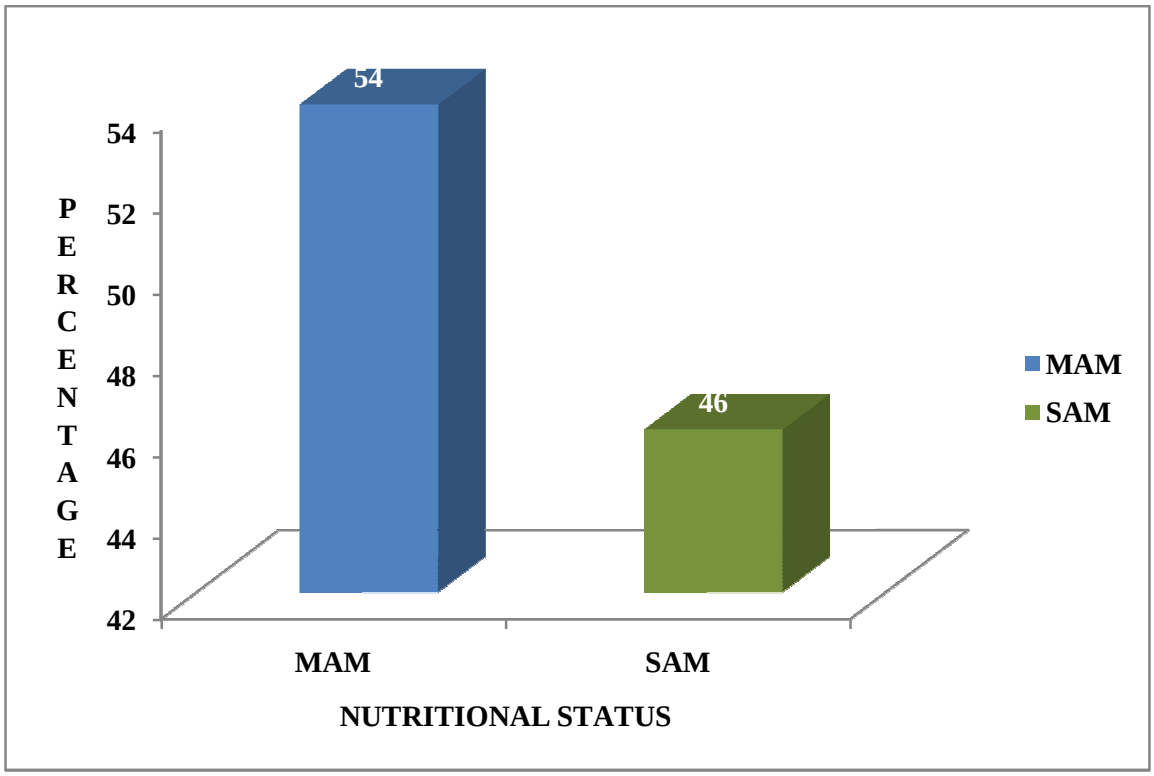
Both male and female children had equally 50%

Frequency Table Shows Nutritional Status of the Malnourished Children

Nutritional Status		Frequency	Percent
	Moderate Acute Malnutrition	94	54.0
	Severe Acute Malnutrition	80	46.0
	Total	174	100.0

In this study, 54% were moderate acute malnutrition (MAM) and 46% were severe acute malnutrition (SAM)

Bar Diagram shows Percentage of the Nutritional Status



In this study, majority of the children were moderate acute malnutrition (MAM) which is about 56%

This Table Shows Frequency of the UTI Symptoms

Symptoms	Fever	Urinary Symptom	Vomiting	Diarrhoea
YES	50(28.7%)	14(8%)	6(3.4%)	10(5.7)
NO	124 (71.3%)	160(92%)	168(96.6%)	164(94.3%

In malnourished children presence of UTI symptoms are

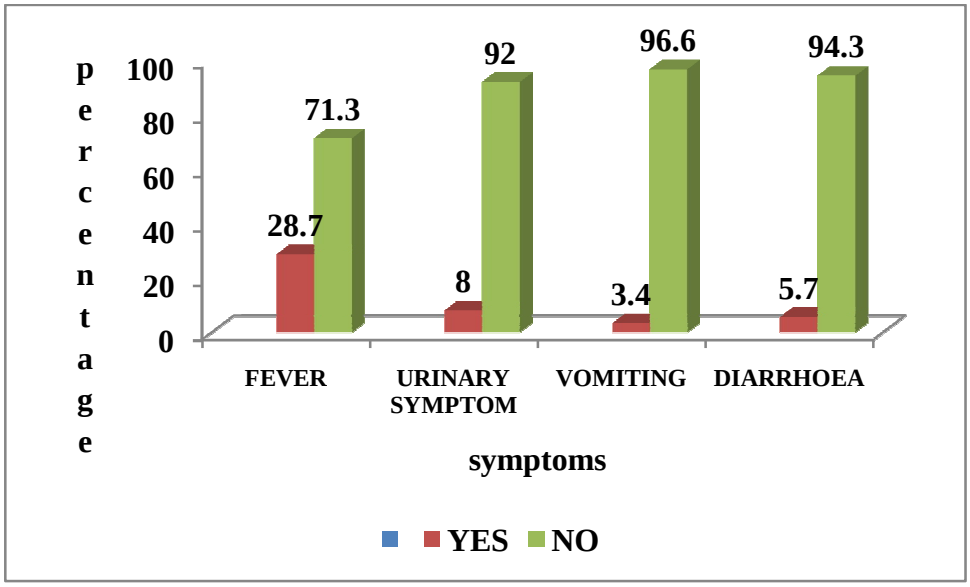
1.Fever 50

2.Urinary symptoms 14

3.Vomiting 6

4.Diarrhoea 10

Bar Diagram Shows Percentage of UTI Symptoms In Malnourished Children



In malnourished children, presence of UTI symptoms is

1.Fever 28.7%

2.urinary symptoms 8%

3.vomiting 3.4%

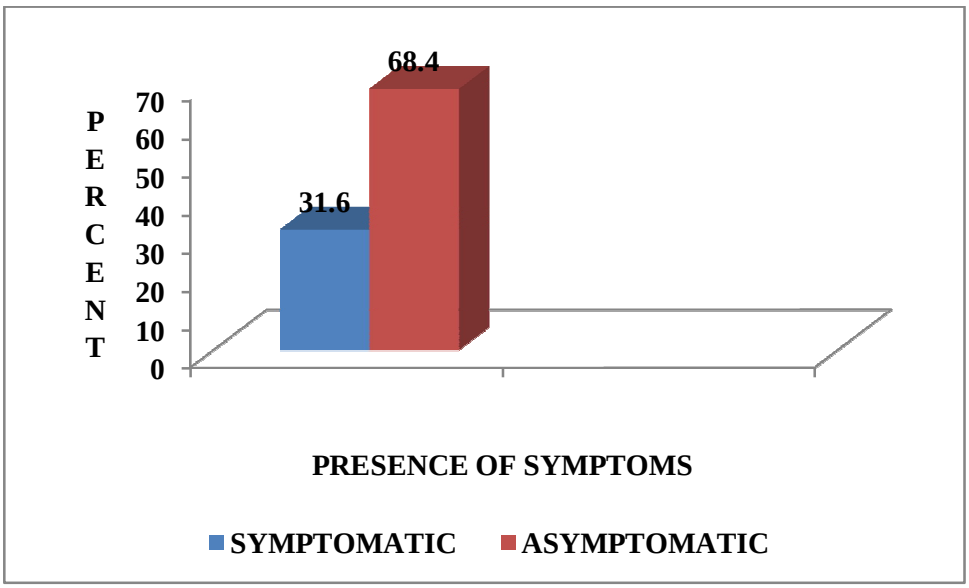
4.Diarrhoea 5.7%

Frequency table shows presence of syptoms in urinary Tract infections.

Sypmtoms of UTI	Frequency	Percent
SYMPTOMATIC	55	31.6
ASYMPTOMATIC	119	68.4
TOTAL	174	100

In study, total 174 children, 55(31.6%) were symptomatic and 119 (68.6%) children were asymptomatic.

Bar Diagram shows Presence of UTI Symptoms in Malnourished Children



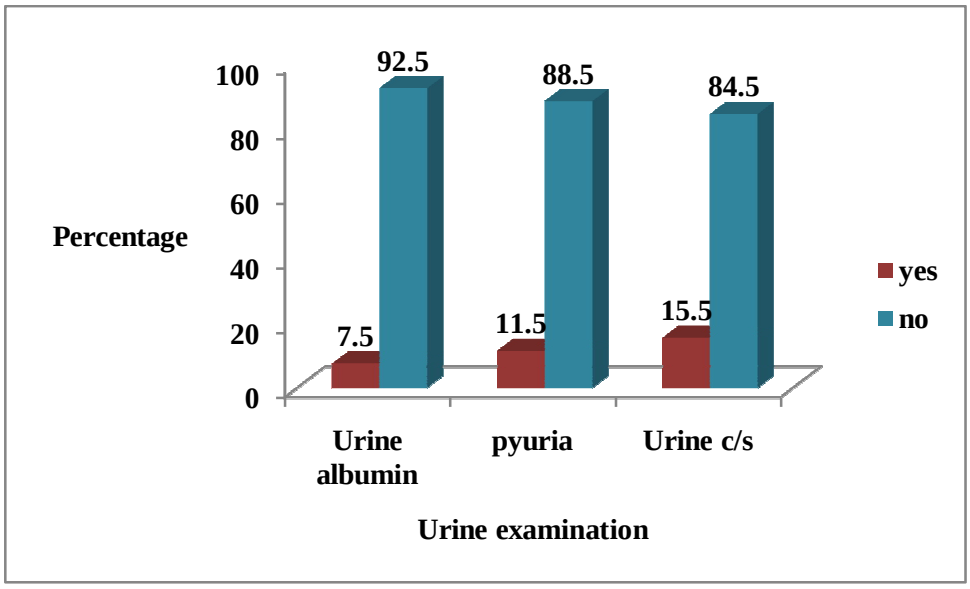
In this study, predominant children does not having UTI symptoms.

Frequency Table shows Results of Urinary Examinations

Urine examination	Urine albumin	pyuria	Urine c/s
yes	**13(7.5%)**	**20(11.5%)**	**27(15.5%)**
no	**161(92.5%)**	**154(88.5%)**	**147(84.5%)**

In this study, urine examinations shows urine albumin positive 13(7.5%), pyuria 20(11.4%) and positive urine culture 27(15.5%) children.

Bar Diagram shows Percentage of Urine Examinations



Urine examinations shows

1.Urine albumin positive 7.5%

2.presence of pyuria 11.5%

3.urine culture present 15.5%

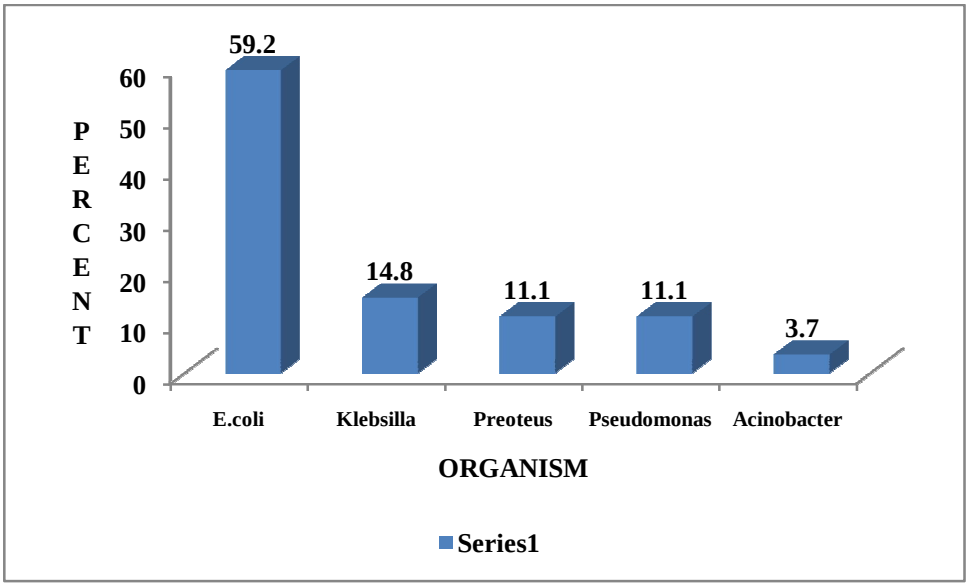
Table show Frequecy of Organism

In Urine culture Positive Children

Organism	Frequency	percent
E.coli	16	59.2
Klebsilla	4	14.8
Preoteus	3	11.1
Pseudomonas	3	11.1
Acinobacter	1	3.7
Total	27	100

Out of 174 children, 27 children were having urine culture growth positive. The results shows E.coli (16), klebsilla(4), proteus(3) , pseudomonas (3) and acinobactor(1).

This Bar Diagram Shows Percentage Of Individual Organism



The presence of organism in percentage

1. E.coli 59.2%

2.klebsilla pneumonia 14.8%

3.proteus mirabilis 11.1%

4.pseudomonos aerogenosa 11.1%

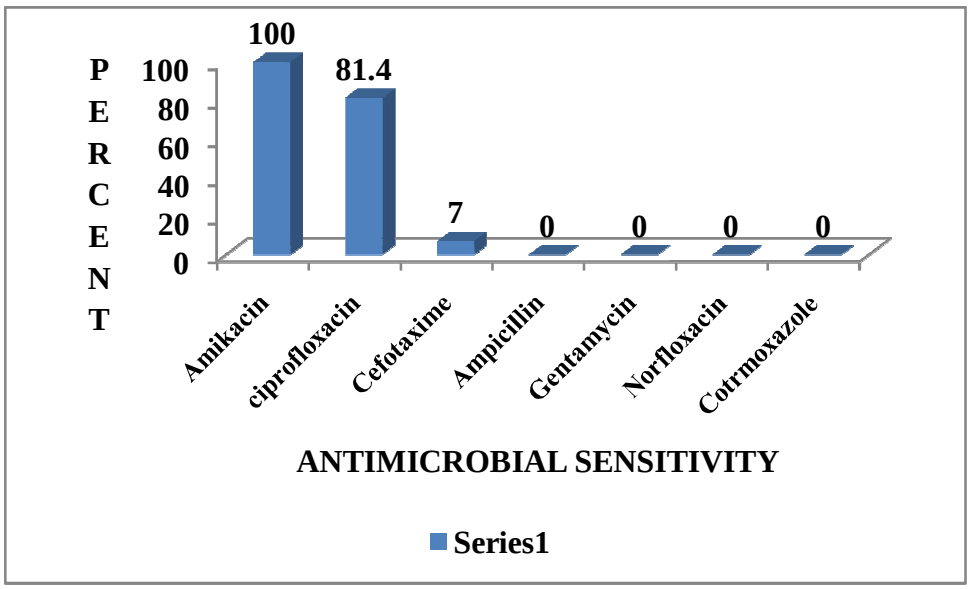
5.Acinobactor 3.7%

Table Shows Antimicrobial Sensitivity To The Organism

Antimicrobial	Frequency	percent
Amikacin	27	100
ciprofloxacin	22	81.4
Cefotaxime	2	7
Ampicillin	0	0
Gentamycin	0	0
Norfloxacin	0	0
Cotrmoxazole	0	0

In this study, only 3 drugs are having sensitivity. Amikacin, ciprofloxacin and cefotaxime had sensitivity.

This Bar Diagram shows Antimicrobial Sensitivity Pattern to the Organism



Antimicrobial sensitivity pattern

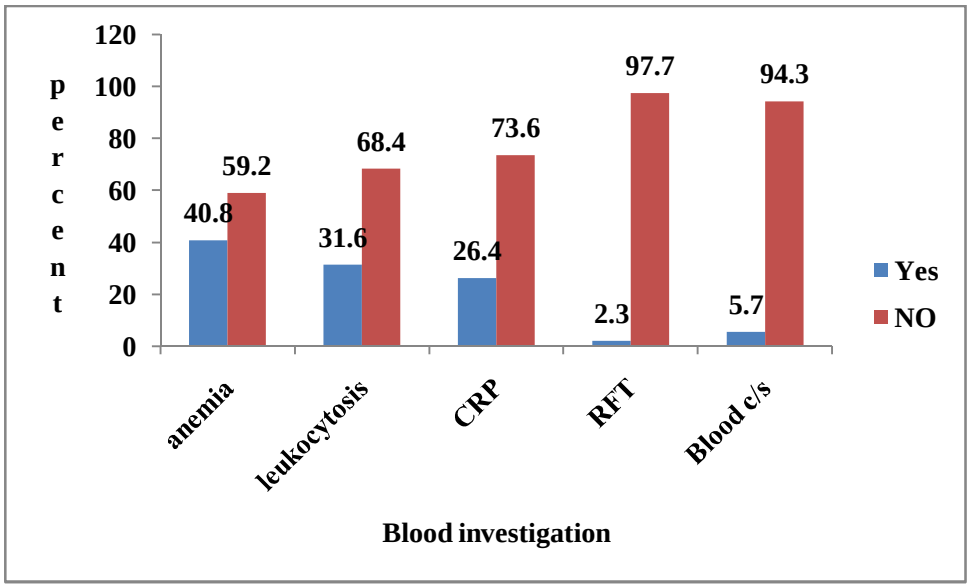
1. Amikacin 100%
2. Ciprofloxacin 81.4%
3. Cefotaxime 7%
4. Ampicillin 0%
5. Gentamycin 0%
6. Norfloxacin 0%
7. Cotrimoxazole 0%

Table Shows Blood Investigation in Malnourished in Children

Blood investigation	anemia	leukocytosis	CRP	RFT	Blood c/s
Yes	71(40.8%)	55(31.6%)	46(26.4%)	4(2.3%)	10(5.7%)
NO	103(59.2%)	119(68.4%)	128(73.6%)	170(97.7%)	164(94.3%)

Out of 174 children , presence of anemia are 71 children. Leukocytosis was about 55 children. Renal function test elevated children are 4 and blood culture positive are 10 children.

Bar Diagram shows percentage of Blood investigations.



The results of blood investigations in out of 174 children,

1. Anemia 40.8%

2. leukocytosis 31.6%

3. C-reative protein positive 26.4%

4. presence of blood culture growth 5.7%

This Table Shows Total Of 180 Children Was Taken To Initial Study

USG (abd)	Frequency
Normal	17
Features of UTI	10
Urinary tract abnormality	6
Not done	147
Total	180

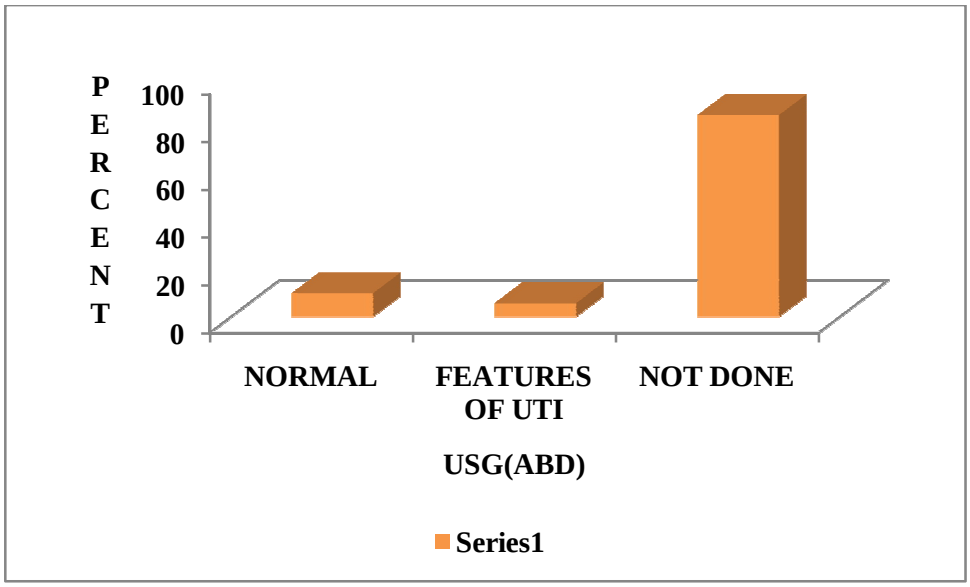
In this, 6 children of urinary tract abnormality cases were excluded from the study.

This Table Shows Frequency Of 174 Children

USG (ABD)	Frequency	Percent
Normal	17	9.8
Features of UTI	10	5.7
Not done	147	84.5
Total	174	100

In this study, 17 cases were showing normal USG. 10 children were showing features UTI. In this study, renal USG was not done for 147 children.

Bar Diagram Depicts the Features of USG in Percentage



Renal USG was done in urine culture positive cases only(15.5%).of 27 cases, 17 Children shows normal USG and10 cases shows features of UTI.

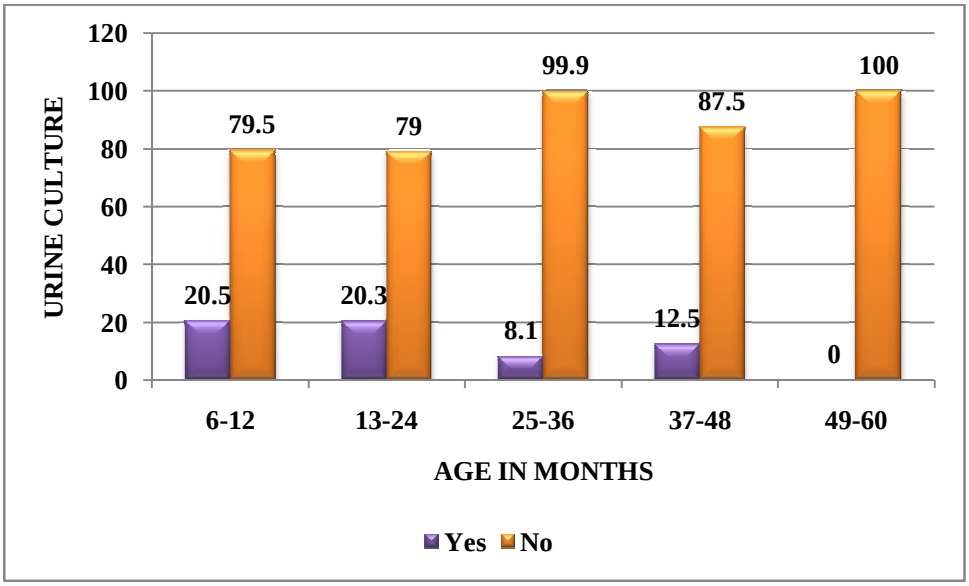
Cross Table Shows Presence of Urine Growth in Age Wise

Age in months	Frequency	Urine C/S		Total
		Yes	No	
6-12	39	8(20.5%)	31(79.5%)	39
13-24	64	13(20.3%))	51(79.5)	64
25-36	37	3(8.1%)	34(91.9%)	37
37-48	24	3(12.5%)	21(87.5%)	24
49-60	10	0%	10(100%)	10
TOTAL	174	27(15.5%)	147(84.5%)	174

In this study, Urine culture positive was 13 in the age group of 13 -24 months of the age. 8 children were in the age group of 6 months to 12 months and 40 to 60 months of malnourished children were not having any urine culture positive..

Bar Diagram Shows Age Wise Presence

Urine Culture In Malnourished Children



In total of 174 malnourished children, 27 children were having urine growth which is 15.5%. In UTI Children 25.5% were in the age group of 6 month to 12 months. Children in the age group of 49-60 months were not having any growth.

Presence Of Urine Growth In Malnourished Children

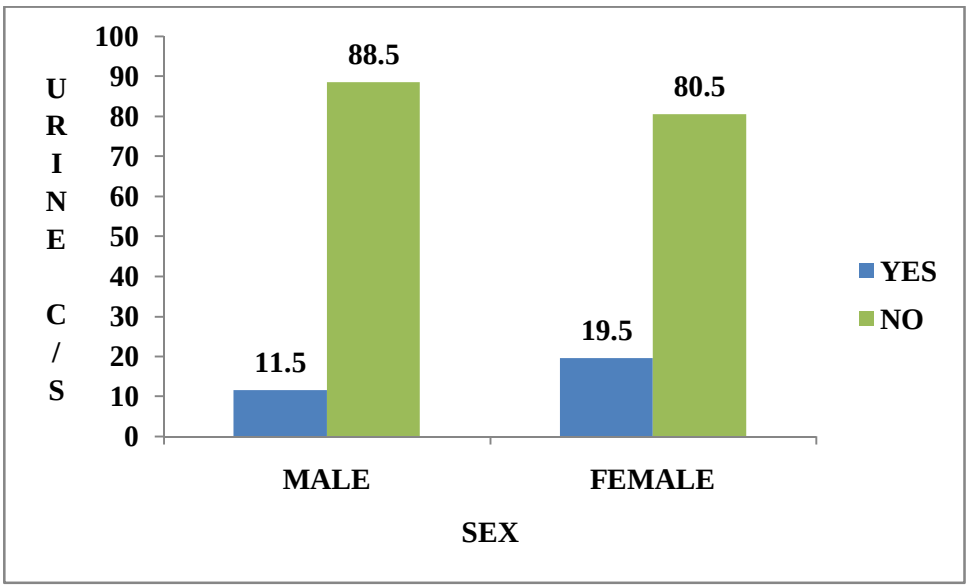
Cross Table

Sex	Urine C/S				Total
	Yes		No		
	Frequency	Percentage	Frequeny	Percentage	
Male	10	11.5	77	88.5	87
Female	17	19.5	70	80.5	87
Total	27		147		174

In this study, 19.5% of the malnourished female children had urine growth positive in compared to male children. Male children were having 11.5% only positive growth.

Bar Diagram shows Gender wise presence of

Urine Culture Growth



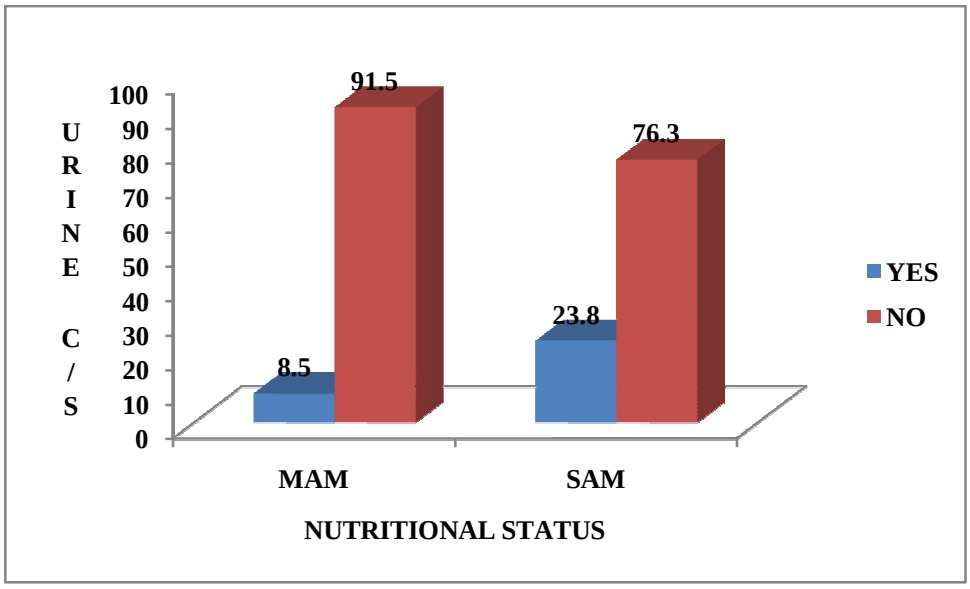
Out of the 174 malnourished children, 19.5% of the female malnourished children were having urine growth positive. but male malnourished Children, were having only 11.5%.

Cross Table shows Presence of Urine Culture Growth in Nutritional status wise

Nutritional Status	Urine C/S				Total
	Yes		No		
	Frequency	Percentage	Frequency	Percentage	
Moderate Acute Malnutrition	8	8.5	86	91.5	194
Severe Malnutrition	19	23.8	61	76.2	80
Total	27		147		

In total malnourished children, severe acute malnutrition had highest number of urine culture positive which was about 23.8% where as in moderate acute malnutrition, urine culture growth was 8.5 % only.

Bar shows UTI in Nutritional status wise



In total malnourished children, SAM children were having highest percentage of UTI which was about 23.8%. And MAM children were having 8.5% only.

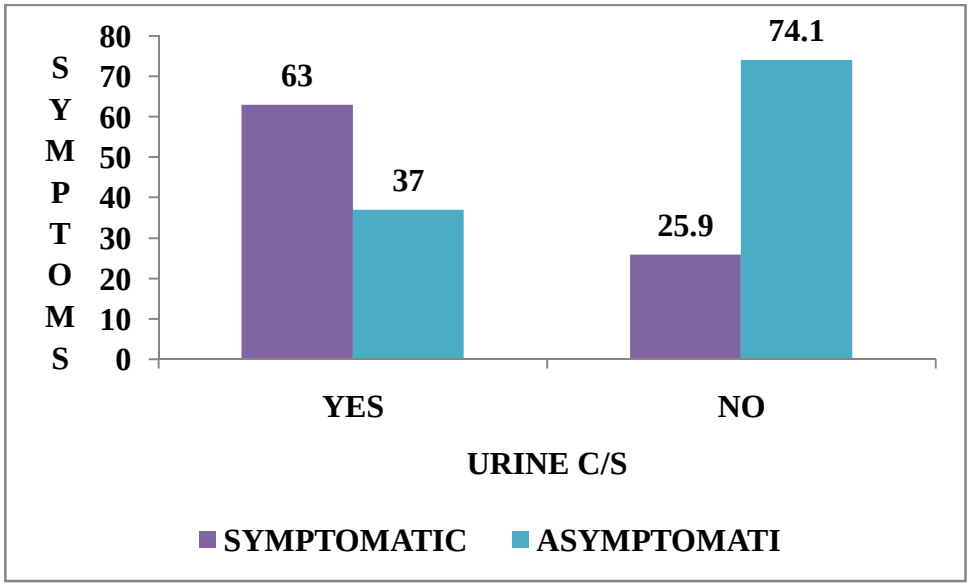
Table Shows In UTI Percentage of Symptomatic Children

Urine Culture Positive	Symptoms of UTI				Total
	Yes		No		
	Frequency	Percent	Frequency	Percent	
Yes	17	63	10	37	27
No	38	25.9	109	74.I	147
Total	55		119		174

Out 27 urine growth children, 63 % (17) of the children were symptomatic and 37%(10) of the children were asymptomatic.

Bar Diagram Shows Percentage Of

Symptomatic UTI Malnourished Children



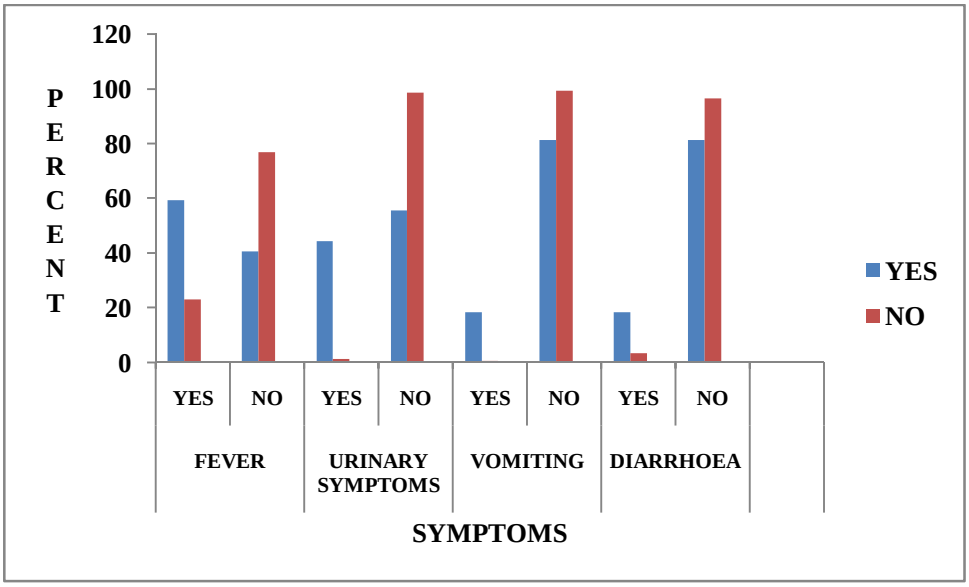
In malnourished children with UTI, 63% of the children were symptomatic. And 37% children were asymptomatic.

Cross Table shows Presence of UTI symptoms in Bacteriuria Children

Urine growth	Fever		Urinary Symptoms		Vomiting		Diarrhoea	
	Yes	No	Yes	No	Yes	No	Yes	No
Yes	16(59.3%)	11(40.7%)	12(44.4%)	15(55.6%)	5(18.5%)	22(81.5%)	5(18.5%)	22(81.5%)
No	34(23.1%)	113(76.9%)	2(1.4%)	145(98.6%)	1(7%)	146(99.3%)	5(3.4%)	142(96.6%)
Total	50	124	14	150	6	168	10	164

Presence of individual symptoms are fever (11), urinary symptoms(12),vomiting(5) and diarrhea(5) in UTI children.

Bar diagram shows percentage individual symptoms



Presence of symptoms

1.fever 59.3%

2.urinary symptoms 44.4%

3.vomiting 18.5%

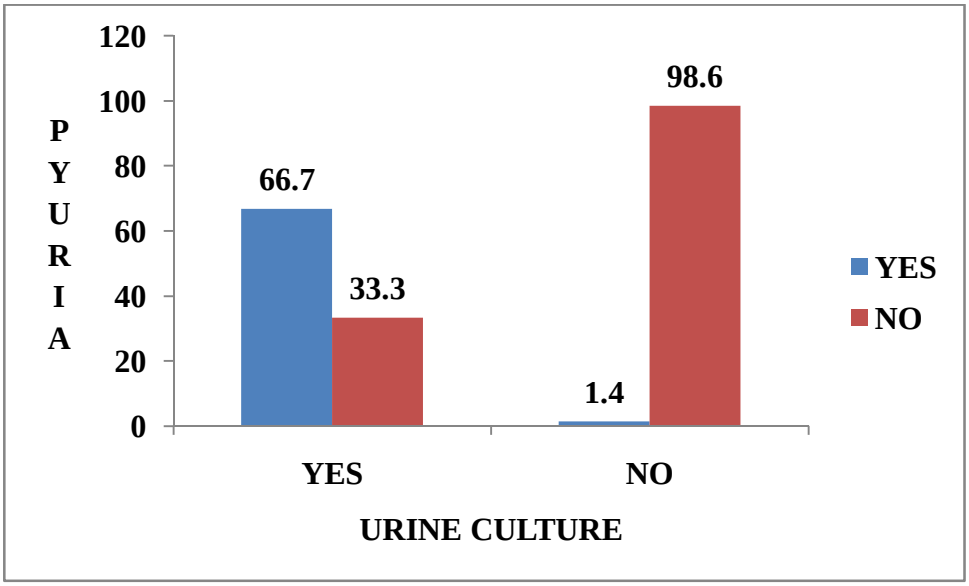
4.Diarrhoea 18.5%

Cross Table shows Presence Pyuria in Malnourished UTI Children

Urine culture	Pyuria				Total
	Yes		No		
	Number	Percent	Number	Percent	
Yes	18	66.7	9	33.3	27
No	2	1.4	145	98.6	147
Total	20		154		174

In this study, 18 children of UTI were having presence of UTI. And 9 UTI children were not having pyuria.

Bar diagram shows percentage of Pyuria in malnourished UTI children



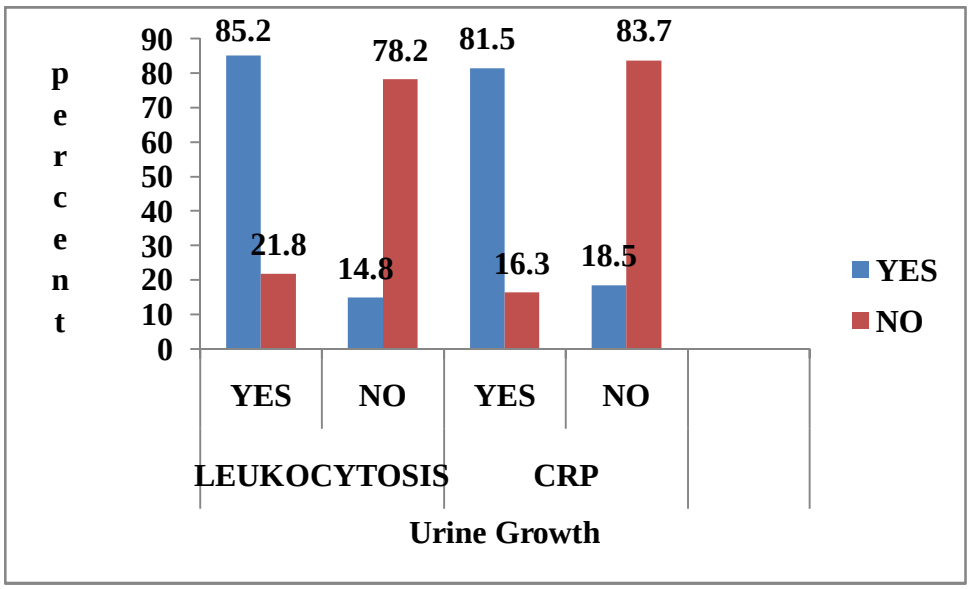
In this study, 66.7% of the children with UTI were showing pyuria and 33.3 % of UTI children were not having presence of pyuria.

Cross Table Shows Raised Leukocytosis And C-Reactive Protein Malnourished Uti Children

Urine growth	Leukocytosis				CRP			
	Present		Absent		Positive		Negative	
	Number	%	Number	%	Number	%	Number	%
Yes	23	85.2	4	14.8	22	81.5	5	18.5
No	32	21.8	115	78.2	24	16.3	123	83.7
Total	55		119		46		128	

In this study,23 children shows leukocytosis out of 27. And 22 children show c- reactive protein in UTI children.

Bar Diagram Shows Percentage Leukocytosis And C-Reactive Protein In Malnourished UTI Children



Out of 27 cases of UTI, 85.2% of children were showing leukcocytosis and 81.5% of children shows CRP positive.

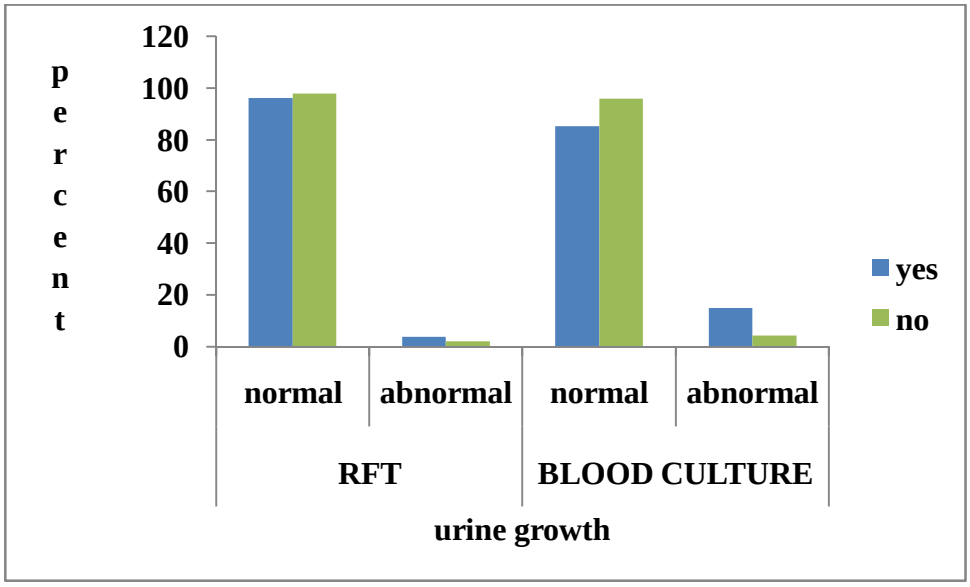
Table shows RFT Elevation and Blood Culture Positive

in Malnourished UTI Children

Urine Growth	RFT				Blood culture			
	Normal		Abnormal		Normal		Abnormal	
	number	%	number	%	number	%	number	%
Yes	26	96.3	1	3.7	23	85.2	4	14.8
No	144	98.0	3	2	141	95.6	6	94.3
Total	170		4		164		10	

In urine culture positive children, 1 child was having abnormal renal functions test. And 4 children are showing blood culture positive.

Bar Diagram shows percentage renal functions test abnormality and blood Culture Growth in UTI Children



In this study, 1child was having renal functions abnormality which is about 3.7%.and 4 children were showing presence of blood culture growth which is about 14.8%.

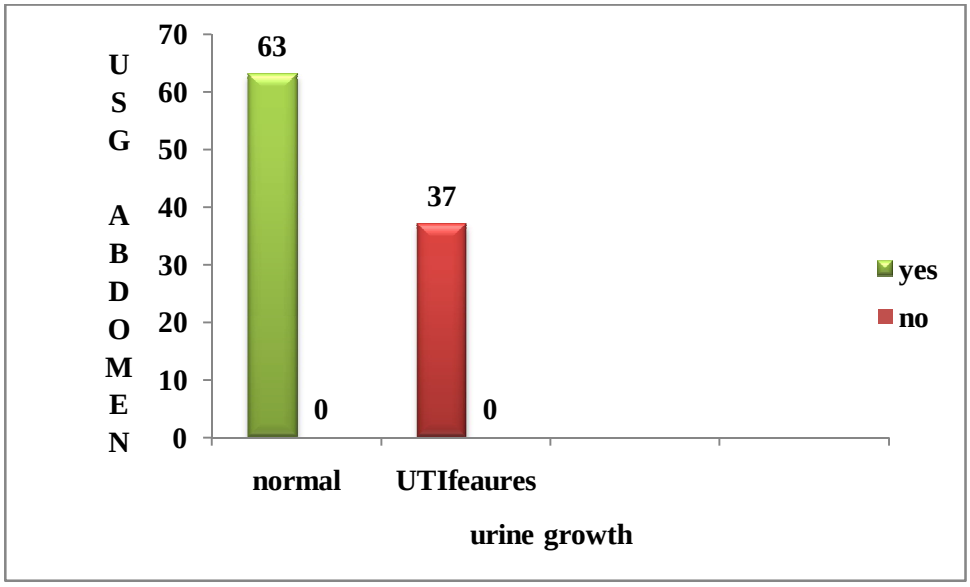
Cross Table shows findings of in Malnourished

UTI Children

Urine growth	USG (abdomen)					
	Normal		UTI features		Not done	
	Number	%	Number	%	Number	%
Yes	17	63	10	37	0	0
No	0	0	0	0	147	100
Total	17		10		147	

In this study, out of 27 children of UTI, 17 children shows normal renal and 10 children shows features suggestive of UTI.

Bar Diagram Shows Percentage of Renal USG Findings In Malnourished UTI Children



In this study, out of 27 UTI children, 63% of children are having normal USG findings. And 37% of the children were showing features suggestive of UTI.

RESULTS & ANALYSIS

Age

In our study, children between 6 month to 5 year (6 month to 60 month) were taken for analysis. Initially 180 children were taken to the study. 6 children were excluded from the study according to exclusion criteria.

Out of 174 children, 39 were in between the age group of 6 month to 12 months. 64 children were in 13-36 months of age. 24 were in 37-48 months of age and 10 children were in 49-60 months of age. In the study, majority of the children were the 13-24 months of the age about 38.8%.

Sex

In this study, out of 174 children, males were 87(50%) and female children were 87 (50%). According to the gender, children were 50% each.

Nutritional status

The total of 174 children, 94(54%) children were moderate acute malnutrition (MAM) where as 80(46%) children were severe acute malnutrition(SAM). In this study,s majority of the children was severe acute malnutrition.

In this study, urine culture positive children were 8(8.5%) from MAM and 19(23.8%) from SAM.

Edema

Out of 174 children, 4 children had edema which was about 2.3%

Fever

In total 174 children, 50 children were having fever which is about 28.7%. In urine culture positive cases, fever was 16(59.3%) and without fever was11(40.7%) cases.

Urinary Symptoms

14 children were having urinary symptoms in total of 174 children. In 14 children, 12 children were having urine culture positive which was about 85.7% in children with urinary symptoms. In urine culture positive children, presence of urinary symptoms was 44.4%.

Vomiting

In total 174 children, vomiting was present4 (3.4%). In urine culture positive cases, 5 children were having vomiting which was about 18.5%.

Diarrhoea

In total 174 malnourished children, 10(5.7%) cases were present with diarrhoea. In urine culture positive cases,5(18.5%) children were having diarrhoea.

Urine Albumin

In total 174 children,13(7.5%) were urine albumin positive. In urine culture positive case 11 cases were positive which is about 40.7%.

Pyuria

Out of 174 children, presence of pyuria is 21(12.5%). In urine culture positive cases, 18(66.7%) cases had pyuria. 9(33.3%) cases had without pyuria.

Anemia

In total 174 children, 71(40.8%) children were having anemia, in urine culture growth cases, presence of anemia was 21(29.6%).

Leukocytosis

55(31.6%) of children were having leukocytosis in out of 174 children. In urine culture positive patients, 23(85.2%) cases had leukocytosis.

RFT

Out of 174 children, 4(2.3%) cases are showing Renal function test elevated. In urine culture positive children, 1 case was only positive.

Blood culture

In total malnourished children, 10(40%) case are blood culture positive. In urine culture positive cases, 4(14.8%) cases had blood culture positive.

USG RENAL

Urine culture positive children are done Renal ultrasonogram. 17 (63%) case are normal USG. Features of UTI are present in 10(37%).

Urine culture

In this study totally 180 children were done urine culture. 33 children had urine culture growth . In these children was done renal ultra sonogram. 6 cases had urinary tract abnormalities which are excluded from the study according to exclusion criteria.

Of 174 malnourished children, 27(15.5%) malnourished children had urine culture growth.

In urine culture positive children, 13-24 months of the children were having highest number of urine growth which was about 13(48.1%). The age group of 49-60 months was not having any presence of urine culture growth.

In urine growth positive children, 8(29.6%) cases were in moderate acute malnutrition(MAM) and19(70.4%) cases were in severe acute malnutrition(SAM).

In urine growth positive children, 17(63%) of the children were symptomatic where as 10(37%) of children were asymptomatic.

Presence of symptoms in these children are fever (59.3%), urinary Symptoms (44.4%), vomiting (18.5%) and diarrhoea(18.5%).

In urine culture positive children, leukocytosis elevation was 23(85.2%) and CRP positive was 22(81.5%) and presence of blood culture growth was 4 (14.8%).

In these children, raised renal function was 1(3%) only.

In these children, renal ultra sonogram showed that 17(63%) was normal. And 10(37%) was features suggestive of UTI.

Out of cases of UTI, presences of organism are

1. E.coli 59.3%(16)
2. Klebsilla pneumonia 14.8%(4)
3. Proteus mirabilis 11.1%(3)
4. Pseudomonas aerogenosa 11.1%(3)
5. Acinobactor 3.7%(1)

Out of 27 urine culture growth children, presence of antimicrobial sensitivity was

1. Amikacin 100%(27)
2. Ciprofloxacin 81.4%(22)
3. Cefotaxime 7%(2)
4. Ampicillin 0%
5. Gentamycin 0%
6. Norfloxacin 0%
7. Cotrimoxazole 0%

DISCUSSION

This study was done in institute of child health, egmore, Chennai. This study investigated 180 malnourished children in the age group of 6 months to 60 months. 6 children were excluded from the study because of abnormal renal USG features.

In total of 174 malnourished children, majority of the children were <2 years. In this, 13- 24 months of the age children were common .

In the study, male and female were present equally about 50% each. There is no gender preponderance. In the study, observed prevalence of the Bacteriuria was 15.5%. This prevalence is almost similar to study which was observed by Arvind Bagga et al about 15.2%[4]. While other studies showed varying prevalence about 5% to 30%.

The age groups of 6-12 months of the children were most commonly having bacteriuria about 8(20.5%) children of 174 malnourished children.And12-24 months of age children were having 20.3%. In children with age group of 49-60 months did not have any bacteriuria. This confirms that children more than 2 year are having less chance of UTI, as mentioned in previous studies.

In the study, 17(19.5%) of the female malnourished children were having bacteriuria. In 27 cases of UTI children, 63% were female children. This study also confirms the previous studies observations. In H.CAKSEN et al observed that 61% were female in malnourished children with UTI [3]

This study observed that severe acute malnutrition had more number of UTI (23.5%) as compared to the moderate acute nutrition (22.8%). In previous study, Arvind Bagga observed that UTI was increasing depending upon the severity of the malnutrition [3].

In UTI children, symptomatic was 17(63%) while asymptomatic was 10(37%). This explains that malnourished children with UTI may be asymptomatic also. Previous studies were not clearly mentioning about prevalence of UTI in asymptomatic malnourished children [11]. This study observes the presence of symptoms which are fever 59.3%, urinary symptoms 44.4%, vomiting 18.5% and diarrhea 18.5%. Fever is the commonest symptom of UTI in malnourished children

Pyuria was present in 20 children out of 174. Of 20 cases, 18 children were having bacteriuria. In 27 UTI children, 18(67%) children were having pyuria and remaining children were not having bacteriuria 9(33%). This explains that malnourished children may not have pyuria in addition to the symptoms. In previous studies, pyuria was about38.8 % (H.CAKSEN et al) [3].

The commonest organism causing UTI in malnourished children was E.coli about 16(59.2%). E.coli is the commonest organism causing UTI as reported in previous studies. Rare organism like acinobactor 1 (3.7%) was also reported in our studies. In previous studies are also showing rare organism like enterobactor, citrobactor and salmonella species (H.CAKSEN et al) [3].

These organisms are showing antibiotic sensitivity pattern. Amikacin (100%), ciprofloxacin (81.4%), and cefotaxime were showing sensitivity pattern. Other commonest drugs like ampicillin, norfloxacin, cotrimoxazole were showing resistance to these organisms. Third generation cephalosporin is also developing resistance to these organism.

In this study, of 27 children of UTI, 85.2% of children were having leukocytosis and 81.5% of the children were showing CRP positive. Leukocytosis and CRP shows presence of infections. In asymptomatic UTI children were also having leukocytosis and CRP positive. These laboratory findings are also additional evidence of UTI in asymptomatic children. In previous studies, Arvind Bagga describes acute phase reactants are an indirect evidence of bacteriuria in asymptomatic children with UTI [4].

Of 174 malnourished children, 10 children were showing blood culture growth .In UTI children, 4 cases were showing blood culture growth. Septicemia is one of complication of UTI [11].

In this study, total 180 children were taken to the study. Of this, 33 cases were having urine culture growth. These cases were done renal USG. Of 33 children, 6 cases had urinary tract abnormality which was excluded from the study. Of 27 Bacteriuria children, 17(63%) had normal renal USG and 10(37%) had features of UTI.

LIMITATIONS

In this study, we did not have controls. So we are not able to match the parameters. In this study, we are not evaluated the risk factors causing UTI in malnourished children. In this study, we have done only clean midstream urine collection method. But the gold standard is supra pubic aspiration. So there is a possibility contamination.

RECOMMENDATIONS

All malnourished children must be think of having UTI. We have to send sample for urine culture in all malnourished children. So empirical antibiotic therapy is needed to prevent pyelonephritis and renal scarring.

CONCLUSION

In our study, Prevalence of urinary tract infection is 15.5%. Of 15.5%, severe acute malnutrition (SAM) is having 10.9% of UTI while moderate acute malnutrition(MAM) is having 4.6% only. Severity of the malnutrition is also increasing the UTI . Most common organism causing UTI is E.coli. The most sensitive antimicrobial agents to these organisms are Amikacin, ciprofloxacin to in our tertiary hospital. Other drugs were developed resistance.

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ABBREVIATIONS

UTI	**:**	**Urinary tract Infection**
MAM	**:**	**Moderate Acute Malnutrition**
SAM	**:**	**Severe Acute Malnutrition**
WHO	**:**	**Word Health Organisation**
RFT	**:**	**Renal Functions Test**
CRP	**:**	**C-Reactive Protein**
USG	**:**	**Ultra Sonagram**

INFORMATION SHEET

Place of Study	**:**	**INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN** **Nutrition OPD & Medical Ward**
Name of the Investigator	**:**	**Dr.A.Senthil Kumar**
Name of the Participant	**:**	
Age	**:**	
Sex	**:**	
Hospital No.	**:**	
Study Title	**:**	**Prevalence of Urinary Tract Infection in Malnourished Children aged 6 Months to 5 yrs attending tertiary care centre**

- We request to participate in the study. We are conducting study to find out prevalence of Urinary tract infection and culture & sensitivity pattern to organism in the malnourished children aged 6 months to 5 years (Severe acute malnutrition and moderate acute malnutrition according to the criteria of the WHO)

- We will collect in all participants a clean catch midstream urine sample and will be sent to the laboratory for urine routine examination and culture and sensitivity.

- ❖ We also collection blood samples for complete blood count, blood culture, C - reactive protein.

- ❖ We also do USG (Abdomen) for the culture positive patients.

- ❖ Privacy of the patient in the research will be maintained throughout the study. The event of any publications all presentation resulting from the research, no personally identifiable information will be shared.

- ❖ Taking part in this study is voluntary. You are free to desire whether to participate in the study or to withdraw at anytime. Your decision will not be resulting in any loss of benefits to which you are otherwise entitled.

- ❖ The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of the Investigator :

Signature of the Parent or Guardian :

Date:

தகவல் படிவம்

ஆய்விடம் : அரசினர் குழந்தைகள் நலமருத்துவமனை, எழும்பூர், சென்னை-600 008.

ஆய்வாளர் : அ.செந்தில்குமார்

பங்கு பெறுபவரின் பெயர் : வயது : பாலினம் :

மருத்துவமனை எண் :

ஆய்வு தலைப்பு: 6 மாதம் முதல் 5 வயது வரையுள்ள போதிய ஊட்டச்சத்து குறைபாடு உள்ள குழந்தைகளில் சிறுநீரக பாதையின் நோய் தொற்று பாதிப்பு எவ்வளவு என்றும், எந்த நோய்கிருமிகள் பொதுவாக உள்ளன என்றும், அந்த நோய்கிருமிக்கு எதிரான செயல்திறன் மிக்க மருந்து எவை என்றும் கண்டறிதல் பற்றிய ஆய்வு.

1. தங்கள் குழந்தையையும் இந்த ஆய்வில் பங்குபெற கேட்டுக் கொள்கிறோம்.
2. இந்த ஆய்வில் சிறுநீரக மாதிரி சேகரிக்கப்படும்.
3. முதலில் ஆண் உறுப்பு மற்றும் பெண் உறுப்பு நன்கு சோப்பு நீரால் கழுவப்பட வேண்டும். ஆண் குழந்தைகளுக்கு ஆண் உறுப்பு முன் தோல் நீக்கி சிறுநீர் சேகரிக்கப்படவேண்டும். பெண்குழந்தைகளுக்கு லேபியா நீக்கி சிறுநீர் சேகரிக்க வேண்டும். முதலில் வரக்கூடிய 10 மிலி சிறுநீரை விட்டுவிட்டு நடுவில் வரக்கூடிய சிறுநீரை சேகரிக்க வேண்டும். சேகரிக்கப்பட்ட சிறுநீர் மாதிரி ஆய்வுக்கு உட்படுத்தப்படும்.
4. மேலும் இரத்த அணுக்கள் எண்ணிக்கை மற்றும் இரத்தத்தில் கலந்துள்ள கிருமிகளை தெரிந்து கொள்ள 3மி.லி. இரத்தம் சேகரிக்கப்பட்டு ஆய்வுக்கு உட்படுத்தப்படும்.
5. உங்கள் குழந்தையைப் பற்றிய தனிப்பட்ட விவரங்கள் யாருக்கும் தெரிவிக்காமல் பாதுகாக்கப்படும்.
6. இந்த ஆய்வில் பங்கு பெறுவது உங்கள் தனிப்பட்ட விருப்பமே ஆய்வு ஆரம்பித்தபின் விருப்பம் இல்லை என்றால் தாங்கள் விலகிக் கொள்ளலாம். அவ்வாறு விலகுவதானது தங்கள் குழந்தையின் சிகிச்சைக்கு எவ்வித பாதிப்பையும் உருவாக்காது.
7. ஆய்வின் முடிவுகள் ஆய்வு நடக்கும்போதோ (தேவை ஏற்படின்) அல்லது ஆய்வு முடிந்த பின்னரோ தங்களுக்கு தெரிவிக்கப்படும். அந்த முடிவுகள் தங்கள் குழந்தையின் சிகிச்சைக்கு பேருதவியாக இருக்கக்கூடும்.

ஆய்வாளரின் கையொப்பம் பெற்றோரின் கையொப்பம்

நாள் :
இடம் :

ஒப்புதல் படிவம்

ஆய்விடம் : அரசினர் குழந்தைகள் நலமருத்துவமனை, எழும்பூர், சென்னை-600 008.

ஆய்வாளர் : அ.செந்தில்குமார்

பங்கு பெறுபவரின் பெயர் : வயது : பாலினம் :

மருத்துவமனை எண் :

ஆய்வு தலைப்பு: 6 மாதம் முதல் 5 வயது வரையுள்ள போதிய ஊட்டச்சத்து குறைபாடு உள்ள குழந்தைகளில் சிறுநீரக பாதையின் நோய் தொற்று பாதிப்பு எவ்வளவு என்றும், எந்த நோய்கிருமிகள் பொதுவாக உள்ளன என்றும், அந்த நோய்கிருமிக்கு எதிரான செயல்திறன் மிக்க மருந்து எவை என்றும் கண்டறிதல் பற்றிய ஆய்வு.

1. இந்த ஆய்வைப் பற்றிய அனைத்து தகவல்களும் எனக்கு தெரிவிக்கப்பட்டது.
2. இதில் பங்கு பெறுவதற்கான ஒப்பந்த படிவமும் எனக்கு விவரிக்கப்பட்டது.
3. ஆராய்ச்சியின் தன்மையும், எனது உரிமைகளும் எடுத்துரைக்கப்பட்டது.
4. இந்த ஆய்வினால் எனது குழந்தையின் நலனுக்கு எந்த தீங்கும் இல்லை என்பதை தெரிந்து கொண்டேன்
5. இந்த ஆய்வில் எனது குழந்தை பங்கு பெற எனது மனமார்ந்த ஒப்புதலை தருகிறேன்.
6. நான் இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக் கொள்ளவும், அதை பிரசுரிக்கவும் என முழுமனதுடன் சம்மதிக்கிறேன்.

பெற்றோரின் கையொப்பம் ஆய்வாளர் கையொப்பம்

நாள் :
இடம் :

PROFORMA

1.	**PATIENT NAME**	**SEX 1.MALE 2.FEMALE**
2.	**AGE IN MONTHS**	**DATE MM YY**
3.	**OP NO/IP NO**	**FATHERS NAME ;** **MOTHERS NAME;**
4.	**ADDRESS:**	
5.	**ANTHROPOMETRY** **1.HEIGHT** **2.WEIGHT** **3. MIDARM CIRCUMFERENCE**	 **1.WEIGHT FOR AGE** **2.HEIGHT FOR AGE** **3.WEIGHT FOR HEIGHT**
6.	**NUTRITIONAL STATUS** **(WHO CLASSIFICATION)**	**1.MODERATE ACUTE MALNUTRITION** **2.SEVERE ACUTE MALNUTRITION**
7.	**SYMPTOMS OF UTI** **1.FEVER** **2.URINARY SYMPTOMS** **3.VOMITING** **4.DIARRHOEA**	 **1.YES 2.NO** **1.YES 2.NO** **1.YES 2.NO** **1.YES 2.NO**
8	**EDEMA**	**1.YES 2.NO**

9.	**GENERAL EXAMINATION**	
10.	**SYSTEMIC EXAMINATION** **1. CVS** **2. RS** **3.ABDOMEN** **4.CNS**	
10.	**URINE** **1.ALBUMIN** **2.PYURIA** **URINE CULTURE** **ANTIMICROBIAL SENSITIVITY**	 **1.YES 2.NO** **1.YES 2.NO** **1.E.COLI 2.KLEBSILLA 3.PROTEUS** **4.PSEUDOMONOAS 5.ENTEROCOCCUS** **5.ACINOBACTOR 6.OTHERS** **1.AMIKACIN 2.CIPROFLOXACIN 3.CEFOTAXIME 4.NORFLOXACIN 5.AMPICILLIN 6.GENTAMYCIN 7.COTRIMOXAZOLE**
11.	**COMPLETE BLOOD COUNT** **1.LEUKOCYTOSIS** **2.ANEMIA**	 **1.YES 2.NO** **1.YES 2.NO**
12.	**C-REACTIVE PROTEIN**	**1.YES 2.NO**

13.	**RENAL FUNCTION TEST**	**1. NORMAL 1.ABNORMAL**
14.	**BLOOD CULTURE GROWTH**	**1.YES 2. NO**
15.	**RENAL USG**	**1.NORMAL 2.FEATURES OF UTI 3. GENITOURINARY TRACT ABNORMALITY 4. NOT DONE**

S.NO	NAME	AGE IN MONTHS	SEX	OP/IP NO	NUTRITIONAL STATUS	EDEMA	FEVER	URINARY SYMPTOMS	VOMITING	DIARRHEOA	URINE ALBUMIN	PYURIA	URINE C/S	ORGANISM	ANTIMICROBIAL SENSITIVITY			ANEMIA	LEUKOCYTOSIS	CRP	RFT	BLOOD C/S	USG(ABD)	SYMPTOMS OF UTI
															A	B	C							
1	VISHAL	36	1	522	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
2	PALLAVI	60	2	832628	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
3	DHANUSHRI	30	2	1255	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
4	RISHI	10	1	831621	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
5	KEERTHANA	60	2	831632	2	2	2	2	2	2	2	2	2					1	1	1	1	2	4	2
6	DANIEL	46	1	1258	2	2	2	2	2	2	2	2	2					1	2	1	1	2	4	2
7	YUVANESH	37	1	1260	1	2	1	2	2	2	2	2	2					2	1	1	1	2	4	1
8	MONISH	24	1	831625	1	2	1	1	2	2	2	1	1	1	1	2		2	1	1	1	2	1	1
9	NILA	36	2	831780	2	2	1	2	2	2	2	2	2					1	1	1	1	2	4	1
10	HANZIKA	24	2	1270	2	2	1	2	2	2	2	2	2					1	2	2	1	2	4	1
11	STALIN	44	1	1210	1	2	2	2	2	2	2	2	2					2	1	1	1	2	4	2
12	OVIYA	18	2	831500	2	2	1	2	2	2	2	1	1	1	1	2		2	2	2	1	2	2	1
13	NITHYASHREE	11	2	831800	1	2	1	2	2	2	2	2	2					2	1	1	1	2	4	1
14	SATHYA	48	2	832864	2	2	1	1	2	2	1	1	1	1	1	2		1	1	1	1	2	2	1
15	JITHESHKUMAR	18	1	1275	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
16	KAMESH	18	1	1280	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
17	JEEVITHA	36	2	1281	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
18	PREM	12	1	832800	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
19	DHANUSHRI	30	2	1290	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
20	KAVYA	14	2	831735	2	2	1	1	1	2	2	1	1	1	1			1	1	1	1	2	1	1
21	JAFRIC	24	1	1292	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
22	KAPIL	36	1	1295	1	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1

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23	OVINESH	18	1	832821	1	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1
24	RINSIKA	11	2	831811	2	2	1	2	2	2	2	2	2					1	1	1	1	1	4	1
25	RAJESH	24	1	1299	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
26	KANIMOZHI	22	2	1300	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
27	VISHNU	12	1	832835	2	1	2	2	2	2	1	1	1	1	1			1	1	1	1	1	1	2
28	DEEPAK	36	1	1310	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
29	MANOJ	12	1	1312	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
30	KOWSHIKA	30	2	832850	1	2	1	1	1	1	2	1	1	2	1	2	3	1	1	1	1	2	1	1
31	YUVARAJ	12	1	832845	2	2	2	2	2	2	2	2	2					1	1	1	1	2	4	2
32	AKSHAYARAJ	18	1	832870	2	2	1	1	1	2	1	1	1	1	1	2		2	1	1	2	2	3	1
33	KRISH	27	1	1320	2	2	1	2	2	2	2	2	2					2	2	2	1	2	4	1
34	DEEPIKA	9	2	1322	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
35	SATHISH	36	1	1325	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
36	SUDHARSHAN	8	1	832911	2	2	1	2	2	2	2	2	2					1	1	1	1	2	4	1
37	PALLAVI	47	2	1330	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
38	SANTHOSH	19	1	832903	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
39	BALAMURALI	31	1	1345	1	2	1	2	2	2	2	2	2					2	2	2	1	2	4	1
40	PADMA	27	2	1348	2	2	2	2	2	2	1	1	1	2	1	2		1	1	1	1	1	2	2
41	DEVI	8	2	832910	2	2	1	2	2	1	1	2	2					1	1	1	1	2	4	1
42	GURU	48	1	1349	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
43	RAJESH	40	2	1349	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
44	VELLAMMAL	16	2	832945	2	2	2	2	2	2	1	2	1	1	1	2		1	1	1	1	2	2	2
45	GURUCHANDRAN	11	1	832950	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2

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46	SHANTHI	15	2	1360	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
47	KALAIYARASI	18	2	1365	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
48	LOGESH	7	1	831965	2	2	1	2	2	2	2	2	2					1	1	1	1	1	4	1
49	IRFAN	38	1	1367	1	2	2	2	2	2	2	2	2					2	2	2	1	1	4	2
50	ANTONY	30	1	1370	1	2	2	2	2	2	2	2	2					1	2	2	2	2	4	2
51	BRINDHA	12	2	1375	2	2	1	2	2	2	2	2	2					2	2	2	1	2	4	1
52	MARILIYA	20	2	1377	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
53	SARANYA	26	2	831985	1	2	1	2	2	1	2	2	2					2	1	2	1	2	4	1
54	KANNAN	8	1	1380	2	2	2	2	2	2	2	2	1	1	1	2		1	1	1	1	2	1	2
55	VENKATESH	50	1	1385	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
56	JAYALAKSHMI	8	2	1387	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
57	MONISH	13	1	831995	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
58	USHA	18	1	1390	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
59	RAMU	13	2	1395	2	1	2	2	2	1	1	2	1	1	1	2		1	1	1	1	2	1	1
60	ABDULLAFAR	26	1	1398	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
61	VAISHALI	42	2	832019	2	2	1	1	2	1	2	1	2					2	1	1	1	2	4	1
62	SHANTHI	37	1	1412	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
63	RAGU	32	2	1415	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
64	RAM	15	1	1418	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
65	SOUMYA	18	2	1425	2	2	1	1	2	1	1	1	1	3	1	2		2	1	1	1	2	1	1
66	LENNIN	24	1	832030	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
67	DANUSH	9	1	1428	2	2	1	2	2	2	2	2	2					2	1	2	1	2	4	2
68	RIYA	13	2	1433	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2

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69	KAVYA	24	2	1435	1	2	1	1	1	2	2	2	1	3	1	2		1	1	1	1	2	2	1
70	SARAN	36	1	832055	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
71	SURYA	17	1	1437	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
72	ABDUL	8	1	831628	2	2	2	2	2	2	1	1	1	1	1	2		1	1	1	1	1	3	2
73	PONGODI	7	2	831890	2	2	2	2	2	2	2	2	2					1	1	2	2	2	4	2
74	THRISA	15	2	1440	2	2	2	2	2	2	2	2	1	1	1	2		1	1	1	1	2	1	2
75	KANIMOZHI	50	2	1443	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
76	RIYAZ	48	1	1448	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
77	MOHAN	13	1	1450	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
78	SHALINI	9	2	1454	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
79	KAVITHA	13	2	832885	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
80	MANI	17	1	1460	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
81	NITHYASHREE	42	2	1462	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
82	AJITH	38	1	1465	1	2	1	2	2	2	1	1	1	1	1	2		2	1	1	1	2	1	1
83	UMAR	29	1	832890	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
84	KANIMOZHI	18	2	1466	2	2	1	2	2	2	2	2	2					1	1	1	1	1	4	1
85	VIJAY	7	1	831899	2	2	1	2	2	2	2	2	2					1	1	1	1	1	4	1
86	RUBESH	8	1	1469	2	2	1	2	2	1	2	2	2					1	1	1	1	2	4	1
87	DHANYA	25	2	1470	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
88	VINISHREE	12	2	1473	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
89	KANNAN	13	1	1472	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
90	RAJULU	18	1	831910	1	2	1	2	2	2	2	2	2					1	1	1	1	2	4	1
91	AKASH	56	1	1475	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2

S.NO	NAME	AGE IN MONTHS	SEX	OP/IP NO	NUTRITIONAL STATUS	EDEMA	FEVER	URINARY SYMPTOMS	VOMITING	DIARRHEOA	URINE ALBUMIN	PYURIA	URINE C/S	ORGANISM	ANTIMICROBIAL SENSITIVITY			ANEMIA	LEUKOCYTOSIS	CRP	RFT	BLOOD C/S	USG(ABD)	SYMPTOMS OF UTI
92	HARINI	48	2	1477	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
93	PRAVANTHI	18	2	1478	2	2	1	1	1	2	1	1	2					2	1	1	1	2	4	1
94	HARISH	10	1	831925	2	2	1	1	2	1	1	1	1	1	1	2		1	1	1	2	2	3	1
95	VIMAL	15	1	831931	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
96	ANUSHYA	30	2	1420	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
97	KANIMOZHI	20	2	1430	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
98	RAMESH	19	1	1431	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
99	SHARON	12	1	832940	2	2	1	2	2	2	2	2	2					1	1	1	1	2	4	1
100	NAVEEN	15	1	1437	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
101	YUVARANI	24	2	1438	2	2	1	1	1	2	2	1	1	4	1	2		1	1	1	1	2	1	1
102	KISHORE	27	2	1440	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
103	BARATH	9	1	1445	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
104	INIYA	11	1	832955	1	2	1	2	2	2	2	2	2					2	2	2	1	2	4	1
105	MOHAMMED	44	2	1449	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
106	JAVID	36	1	1450	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
107	SOORYA	28	2	1452	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
108	LOGESH	26	1	1453	2	2	1	2	2	2	2	2	2					1	1	1	1	2	4	1
109	MERLIN	15	2	1455	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
110	KASTURI	36	2	831935	1	2	1	2	2	2	2	2	2					2	2	2	1	2	4	1
111	SAMPATH	17	1	831945	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
112	KAVIYA	24	2	1458	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
113	KEERTHI	10	2	1459	2	2	1	2	2	2	2	2	2					1	1	1	1	2	4	1
114	SAISIVAN	13	1	1460	1	2	1	1	2	2	1	1	1	1	1			1	2	2	1	2	1	1

S.NO	NAME	AGE IN MONTHS	SEX	OP/IP NO	NUTRITIONAL STATUS	EDEMA	FEVER	URINARY SYMPTOMS	VOMITING	DIARRHEOA	URINE ALBUMIN	PYURIA	URINE C/S	ORGANISM	ANTIMICROBIAL SENSITIVITY			ANEMIA	LEUKOCYTOSIS	CRP	RFT	BLOOD C/S	USG(ABD)	SYMPTOMS OF UTI
115	ABINAYA	15	2	831970	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
116	SIVAN	24	1	1462	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
117	DHARANI	8	2	1465	2	2	2	2	2	2	1	1	1	5	1	2		1	1	1	1	2	2	2
118	SANDHYA	14	2	1466	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
119	MONISH	42	1	1468	2	2	1	2	2	2	2	2	2					2	1	1	1	2	4	1
120	MISBHA	48	1	1469	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
121	OVIYA	60	2	1470	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
122	SAMANTHA	30	2	1471	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
123	VISHWA	36	1	832995	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
124	JAYSAKTHI	54	2	1473	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
125	MEENAKSHI	42	2	1475	2	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1
126	KASTHURI	15	2	1477	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
127	JOSEPH	18	1	1478	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
128	SETHUPATHI	24	1	8321010	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
129	PUSPARAJ	12	1	1480	2	2	1	1	1	1	1	1	1	1	1	2		1	1	1	2	2	3	1
130	JOSHNA	24	2	1482	1	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1
131	ANJALI	36	1	1485	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
132	FATHIMA	10	2	1482	2	2	1	2	2	1	2	2	1	1	1			1	1	2	1	1	1	1
133	NALAN	34	1	832020	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
134	KARTHIK	30	1	1487	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
135	YUVEDHA	60	2	1490	1	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1
136	VARSHINI	48	2	1493	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
137	SILAMBU	18	2	1497	2	2	2	2	2	2	2	2	2					1	2	2	2	2	4	2

S.NO	NAME	AGE IN MONTHS	SEX	OP/IP NO	NUTRITIONAL STATUS	EDEMA	FEVER	URINARY SYMPTOMS	VOMITING	DIARRHEOA	URINE ALBUMIN	PYURIA	URINE C/S	ORGANISM	ANTIMICROBIAL SENSITIVITY			ANEMIA	LEUKOCYTOSIS	CRP	RFT	BLOOD C/S	USG(ABD)	SYMPTOMS OF UTI
138	BARANIKUMAR	24	1	1499	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
139	VASANTHAKUMAR	10	2	1502	2	2	1	2	2	2	2	2	2					1	2	1	1	2	4	1
140	HARINI	15	2	1504	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
141	KEERTHIKA	54	2	832025	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
142	SRINI	16	1	1505	1	2	2	2	2	2	2	1	1	1	1	2		1	1	1	1	2	1	2
143	JOHNSON	24	1	1506	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
144	RUBEN	36	1	1507	1	2	2	2	2	1	2	2	2					2	2	2	1	2	4	1
145	ARCHANA	10	2	1509	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
146	RUBEENA	11	2	1511	2	1	2	2	2	2	2	1	1	2	1	2	3	1	1	1	1	1	3	2
147	BARATH	13	1	1512	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
148	MUKILAN	24	1	1513	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
149	POORANI	7	2	1515	2	2	2	2	2	1	2	2	2					1	1	1	1	1	4	1
150	SINDHUJA	48	2	1517	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
151	ASHOK	42	1	1518	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
152	EBENESAR	42	2	832050	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
153	ARUN	9	1	1520	1	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
154	DHANYA	15	2	832066	2	2	1	1	2	2	1	1	1	4	1	2		1	1	1	1	2	2	1
155	KARUNYA	30	2	1522	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
156	INIYAN	36	1	1525	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
157	KANIAN	12	1	1526	2	2	2	2	2	2	2	2	1	2	1	2		2	1	1	1	2	2	2
158	MONIKA	8	2	1527	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
159	KABILAN	15	1	1528	1	2	1	2	2	1	2	2	2					1	2	2	1	2	4	1
160	SASIDHARAN	28	1	1530	2	2	2	2	2	2	2	1	1	2	1	2	3	1	2	2	1	2	1	2

S.NO	NAME	AGE IN MONTHS	SEX	OP/IP NO	NUTRITIONAL STATUS	EDEMA	FEVER	URINARY SYMPTOMS	VOMITING	DIARRHEOA	URINE ALBUMIN	PYURIA	URINE C/S	ORGANISM	ANTIMICROBIAL SENSITIVITY			ANEMIA	LEUKOCYTOSIS	CRP	RFT	BLOOD C/S	USG(ABD)	SYMPTOMS OF UTI
161	KEVIN	10	1	1532	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
162	SRINITHI	13	2	832085	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
163	DEJASRI	18	2	832099	1	2	1	1	2	1	1	1	1	1	1	2		2	2	2	1	2	1	1
164	GANESH	24	1	1535	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
165	SUNDAR	36	1	1537	2	2	1	2	2	2	2	2	2					2	1	1	1	2	4	1
166	SUPRIYA	14	2	1538	2	2	2	2	2	2	2	2	2					1	2	2	1	2	4	2
167	NITHYA	60	2	1539	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
168	RABI	12	1	1541	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
169	NAREN	30	1	1542	1	2	1	1	1	2	2	1	1	1	1			1	1	1	2	2	3	1
170	SIVAN	8	1	1543	2	1	2	2	2	2	2	2	1	1	1			1	1	1	2	2	1	2
171	BINDHUSRI	24	2	1548	2	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
172	UMASHREE	30	2	832110	1	2	1	2	1	1	2	2	2					1	2	2	1	2	4	1
173	RUBYNI	9	2	1450	1	2	1	1	1	2	2	1	1	4	1	2		1	1	1	1	2	2	1
174	SITHISH	15	1	1452	2	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1
175	ABINAYA	48	2	1458	2	2	1	1	2	2	2	2	1	1	1	2		1	1	1	1	2	1	1
176	SINDHU	30	2	1560	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
177	INDHU	12	2	1561	2	2	2	2	2	1	2	2	2					1	2	2	1	2	4	1
178	PARTHIBAN	10	1	832130	2	1	1	2	2	2	2	1	1	3	1	2		1	1	1	1	1	2	1
179	BIJU	24	1	1565	1	2	2	2	2	2	2	2	2					2	2	2	1	2	4	2
180	ANGEL	42	2	1567	1	2	1	2	2	2	2	2	2					2	1	2	1	2	4	1